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[OFFICIAL NOTICE.]

Wrinkle Department, Pacific Coast Gas Association.

OFFICE OF EDITOR, WRINKLE DEPARTMENT,
PACIFIC COAST GAS ASSOCIATION,
1050 J STREET, FRESNO, CAL., May 14, 1902.

To the Members of the Pacific Coast Gas Association: As the Ninth Annual Meeting of the Pacific Coast Gas Association is drawing near, it behooves me, as the Editor of your Wrinkle Department, to remind you that it is time you were sending in your contributions to this department.

Wrinkles mean any small or large device, original in idea if possible, or anything that is not generally known to the gas fraternity, and that will in any way alleviate the trials and troubles of the gas man and promote his welfare and happiness, will be acceptable as a Wrinkle. If you will send in a sketch, photo or drawing, with explanation, it will be fully appreciated at our meeting this summer, as it depends entirely on the contributions, and following discussion of the members, to make these meetings successful.

Now, please, do not be backward, but send in all the Wrinkles you can gather up at once, and before you forget it. You may sign your name or not; just as you like. You surely have around your works, office, or main and service system a lot of original ideas that would be a benefit to some other member who is working under the same conditions.

Kindly make your contributions to this department at once, so as to enable me to get them in order before the meeting. Expecting an early reply, I am, Yours truly, GEORGE S. COLQUHOUN.

BRIEFLY TOLD.

A SATISFACTORY MEETING.—"A.," writing to the JOURNAL under date of the 30th ult., regarding the convention of the Superintendents of the various Companies controlled by the Union Gas and Electric Company, of New York city, which convention was held in Lockport, N. Y., May 13, 14 and 15, says: "This account of a very successful convention of the Superintendents of the works owned by the Union Gas and Electric Company is undoubtedly somewhat belated, but I have the satisfaction of reporting that the meeting was an excellent one from all points of view. Lockport, N. Y., was the meeting place, and our headquarters, meeting room and hotel accommodations were all that could be desired. Representatives from 13 works controlled by the Company answered roll call, and our General Superintendent, Mr. E. E. Witherby, was very much in evidence. The following papers were read: "Card System for Meter Indexing," by Mr. E. M. Walker, Hyde Park, Mass.; "Supply Departments," by Mr. S. R. Walker, Bay City, Mich.; "Gas Engines," by Mr. C. H. Nutting, Chicopee, Mass.; "A Novel Electric Station," by Mr. R. E. Slade, Lockport, N. Y. These topics, which were really well handled, brought out very good discussions. The debates on other subjects were also interesting. Mr. R. E. Slade, Supepintendent of the Lockport Gas and Electric Company, had much to do in connection with the meeting, and he did it well. I should also have said that an illustrated lecture, by Mr. Wilcox, of the General Electric Company, was a feature of the proceedings. On the evening of the 13th the delegates were entertained at a theater party in Buffalo, and on Wednesday a trolley trip was taken to Niagara Falls, where the plant of the Niagara Falls Power Company was inspected, as was also the manufacturing establishment of the Natural Food Company, where the process of building shredded wheat

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into biscuit was observed. A trip over the famous 'Gorge Route,' ended the run. A banquet at the Ellicott Club was the Wednesday evening feature. Thursday the business of the Association was concluded and the delegates departed for their homes, highly pleased with the manner in which the whole affair was conducted. The proprietors of the Commercial Hotel, which was headquarters, are good housekeepers."

NOTES.—Mr. William B. Tuttle, formerly Superintendent of the Long Branch works of the Consolidated Gas Company, of New Jersey, has been appointed General Manager of that Company, vice Mr. C. D. Strong, who, as was told in the JOURNAL last week, is now General Manager of the Lincoln (Neb.) Gas and Electric Company.——The proprietors of the Spokane Falls (Wash.) Gas Company, after a protracted struggle, have obtained from the authorities a renewal of their franchise rights for a period of 43 years. Secretary Aldrich, despite the fact that electric currents for lighting use are almost given away in Spokane, managed to earn sufficient income to pay 6 per cent. on the common and preferred stock of the Gas Company, a result largely brought about by his clever and persistent methods of increasing the output on fuel use account.——Mr. J. A. Greenridge has been appointed Superintendent of the electric division of the business of the Utica (N.Y.) Gas and Electric Company.— At the annual meeting of the shareholders in the Toledo (O.) Gas Light and Coke Company the officers chosen were: Directors, John Cummings, C. R. Faben, Jr., Thos. H. Tracy, M. W. Young, Goorge W. Davis, S. C. Walbridge and Edwin Jackson; President, John Cummings; Vice-President, M. W. Young; General Manager, Charles R. Faben, Jr.; Auditor and Assistant General Manager, Thos. B. Guitteau; Secretary, Thomas Biddle; Assistant Secretary, George M. Wheeler.——The gas plant for the Oklahoma City (O.T.) Gas and Electric Light Company is to be built by Messrs. Baxter & Young, of Detroit.——The sub-aqueous main for the supplying of gas to the outlying district of Toronto, known as the Island, which supply is to be taken from the works of the Consumers Gas Company, of Toronto, has been completed. It was quite an undertaking, and we hope to give later some details respecting the manner in which the main laying was done.——A special dispatch to the New York *Sun*, dated May 30, says: "A deal has just been closed by which the Rochester (N. Y.) Gas and Electric Company gains control of the Citizens Light and Power Company, and the Municipal Gas and Electric Company fades into oblivion. The only one remaining is the Rochester Gas and Electric Company. After the new companies were organized the question of obtaining franchises from the city came up. The Rochester Gas and Electric Company made the proposition that, providing franchises were refused to the new companies, it would furnish $1 gas, which is a considerable reduction over the price prevailing. This most attractive offer came before the Common Council for consideration. Should the franchise be refused the Young-Brady syndicate, who had already spent hundreds of thousands upon their new plant, would be out all the money they had invested. But they had in their employ, at a princely salary, State Committeeman Aldridge, who had given them his word that his friends in the Common Council would not desert him. The opponents of Mr. Aldridge used their utmost efforts to control individual aldermen, but they had not figured upon the tremendous hold that Mr. Aldridge had upon his political supporters. When the proposition to grant a franchise to the Citizens Company came before the Common Council, it went through. Mr. Aldridge saved the day for the Citizens Company, and from that time negotiations were begun by the Rochester Gas and Electric Company to buy up the new rival."——At the annual meeting of the shareholders in the Binghamton (N. Y.) Gas Company the following officers were elected: Directors, J. W. Manier, W. G. Phelps, G. W. Dunn, S. J. Hirschman, C. M. Stone, Geo. F. O'Neil, C. C. Jackson, J. M. Stevens and Emerson McMillin; President, Emerson McMillin; Vice-President, J. W. Manier; Treasurer, R. W. Manier; Secretary, J. W. Douthirt; Asst. Secy. and General Manager, F. B. Wheeler.——Messrs. Charles J. Goulden, John E. Donnelly and Austin G. Scully have incorporated the Annexed District Gas Company. The named object is to furnish gas in those districts of East Chester, Pelham and West Chester, in the Borough of the Bronx, New York, not now piped for gas supply. The incorporators have applied to the Board of Aldermen for an enabling act. They agree not to charge in excess of $1 per 1,000 cubic feet, and to pay into the city treasury 2 per cent. of the gross receipts. The "main offices" of the Company are in Williamsbridge.——At the annual meeting of the Georgetown (D. C.) Gas Light Company the following Directors were elected: John Marbury, Jr., Maurice J. Adler, Wm. Leetch, S. T. Brown, Geo. L. Nicholson, Robt. Weaver, Wm. B. Orme and H. C. Winship.

[OFFICIAL REPORT.—REVISED BY THE SECRETARY.—Continued from Page 804.]

PROCEEDINGS, TWENTY-FIFTH ANNUAL MEETING, WESTERN GAS ASSOCIATION.

HELD IN THE NEW ST. CHARLES HOTEL, NEW ORLEANS, LA., MAY 21, 22 AND 23, 1902.]

FIRST DAY, MAY 21.

Discussion on the paper by Mr. W. A. Baehr, of Denver, Col., on

EXPERIENCES WITH BENCH FUELS.

[For the text of Mr. Baehr's paper see JOURNAL, June 2, p. 801.]

The President—Gentlemen, Mr. Baehr's paper is before you for discussion. Although it is rather detailed in delineation, I would like to have it discussed freely. Will Mr. Chollar say something on the subject?

Mr. Chollar—While papers of this type are very interesting and instructive, they are not specially adapted to extemporaneous discussion, but rather are more useful as works of reference, to be read at our leisure when we have returned home. I was invited to make a few remarks upon this particular paper, but on account of its extreme length and complicated nature I have not had time to thoroughly digest it, so as to discuss it properly. I will, therefore, have to leave that matter to somebody else.

The President—Mr. Cowdery, won't you help us on in the discussion of Mr. Baehr's paper?

Mr. Cowdery—I wish to commend Mr. Baehr very highly for the extensive and complete experiments made by him in this direction. Regarding the burning of coal and coke, that has been so extensively experimented upon and carried out by many of the gentlemen here that little need be said, I think. Some of the gentlemen report that in using the same gas coal for firing that they carbonize to produce their gas, it takes a few more pounds of coal than it does of coke; others report it takes a few less pounds, but, as a general proposition, I believe it is safe to assume that bench firing can be done with the same amount of coal or coke, the quality of which is the same as that used for carbonizing. I have been much interested in the past in endeavoring to fire benches with coke, and some experiments in this direction were undertaken in Milwaukee. However, they were conducted under the personal supervision of Mr. Howard C. Slater, when in our employ, and I should have to fall back upon him to give you the correct details of his experiments. They were not successful, though, so far as he conducted them; but that has not discouraged me, for I still believe as much as I ever did that if the proper stoker is adapted to the proper bench, the continuous feed-stoker could be used to fire the bench with great advantage. I don't believe it would result in the use of many pounds less than where hand stoking is resorted to. My idea has been, where I have thought this out, that coke breeze could be mixed with fine coking coal, in the way of taking ⅔ or perhaps ¾ of coke breeze, and not a great number of pounds additional would be used to carry on the firing. If this could be accomplished there would be a great saving effected in the cost of fuel used in benches, so far as we had coke breeze to carry out that plan. In the event of failure to have coke breeze sufficient we might be able to buy a fine slack coke at lower prices than we ordinarily pay for our gas coal, and there would be a saving in fuel in that respect. The general idea under which the experiments were carried on in Milwaukee was the use of the American stoker, the idea that the fuels could be mixed, and that the coal as it issued from the stoker would be coked, and this coke would be drawn over on to an open grate similar to the open grate in use in the furnaces, and the primary and secondary air could then be used much the same as now to burn that coke; that the mechanical stoker was only the means of introducing the mixed fuel and coking it at the same time of introducing it, so as to make what would naturally be a poor quality of coke thrown upon the grate. I feel that is all I can say upon the subject.

Mr. Steinwedell—Mr. Baehr states that as the coal caked badly it was necessary to frequently poke down the fire, and that the furnaces became badly sooted, thus making it very hard to keep up the heat. If the furnace had been constructed specially for coal it would have been wider and it would not have been necessary to poke the fire. Also, if the waste gas flues had been of larger cross section, even if they had sooted to a certain extent, they would not have influenced the operation of the bench. So far as the mechanical stoker is concerned, taking it from the drawing, the coal is introduced at the bottom of the furnace. Now, with a mechanical stoker on the steam boiler—taking the usual application of such a stoker—the coal is introduced in front of the fur-

nace, and the draught, passing from the front to the rear, the smoke and gases pass over the coal that has been partially burnt and are consumed. In this gas bench furnace the fresh coal and draught being introduced at the bottom, it would seem difficult for the fresh coal to ignite as well as in a furnace having the gases passing from the front to the rear. To accomplish good results with the mechanical stoker, I should think the furnace would have to be very long, and the gas would have to pass to the rear of the furnace and then back to the front and through the top in the usual way.

Mr. Norris—It is hard to talk against a Texas cyclone, but I will state what I can on the subject of forced draughts on benches. Several years ago, in Atlanta, Ga., we used the cinders from all the bench fires, burning them in one of the furnaces. In order to get proper draught we used a Parson's steam-jet blower. The bench thus fired burned off just as heavy charges as its coke fired neighbors, and the result of this practice was a substantial reduction in the coke used in furnaces per ton of coal carbonized in the entire stack.

Mr. Doty—I move a vote of thanks to Mr. Baehr for his very able contribution. In that connection it should be said papers of this character are very much to be encouraged. They should be encouraged even with reference to the commercial side of the business; for if the commercial aspect is not improved by these experiments there would hardly be any necessity for them. This matter of the consumption of coal is a live problem, for which we must get a mechanical substitute; therefore, any substitute for bench fuel, such as coke, is to be encouraged.

The vote of thanks was adopted.

The President introduced Mr. John H. Fitzgerald, of Houston, Tex., who read the following paper on

BEAUMONT OIL FOR GAS MAKING.

Mr. President and Fellow Members of the Association: The subject, "Beaumont Oil for Gas Making," was accepted by me with many misgivings. For various reasons, I would gladly have seen it assigned to some abler member; one wielding a more prolific pen, and better situated for making the necessary tests. The lack of proper equipment makes it very difficult for me to treat the subject in that full and comprehensive manner that its importance deserves.

Regarding its gas making properties I might say, like the dismal man in "Pickwick," "There is nothing of the marvellous in what I have to relate." However, there are some marvellous features connected with the subject. The chief marvel is the colossal producing capacity of the Beaumont Field. To-day, but 16 months after the initial discovery, the number of wells has gone far beyond the 200 mark. These wells have an easy average capacity of 30,000 barrels per day. It will thus be seen that the combined capacity of all the wells is 6,000,000 barrels in 24 hours; 180,000,000 barrels for one month, and 2,160,000,000 barrels for one year.

But pardon this digression; I am getting too far away from the real subject, "Its Gas Making Value." After the 10th of January, 1901, when the great Lucas gusher was brought in, about the first thing it suggested to those in the gas industry was, what effect it would have on the business, and its probable value for gas making. The first reports sent out from the field were that it was a fuel oil, pure and simple, and had very little value for gas making or refining purposes. In February of last year we wrote to the J. M. Guffey Company, who had charge of this well, telling them that we wished to test it for gas making, and asking them to quote us prices. They promptly informed us that they were not prepared to ship oil, but said that if we would furnish them 10 empty barrels they would fill them from the pools where the oil had accumulated before the well had been gotten under control, and ship the same to us free, if we would pay the freight. We readily agreed to this arrangement, and in a few days we had the oil at the works. The test proved so satisfactory that we placed our order for a tank car, and from the time they commenced shipping oil until now we have used the Beaumont oil for making water gas.

After more than one year's experience with this oil, I feel justified in stating that it has a gas making value or efficiency equal to from 85 to 88 per cent. of the Eastern oil. I will say, however, that owing to the different nature of the product, and the difference in the treatment required, it is doubtful if any of the users have, until very recently, obtained results that would justify this assertion. To explain this, I will say that I have no bar photometer, and, therefore, have no means of making exact tests of the candle value of the oil, but judging from the jet photometer passing the mixed product, I believe it to be from 5 to 5.25 candles per gallon per 1,000 feet. From one or two other places where Beaumont oil is being used I found, upon inquiry, that they were getting about the same results, or approximately 5 candles per gallon per 1,000 feet.

About the 1st of February, this year, a well known operating and constructing company sent their expert operating engineer to New Orleans for several weeks, and later to Galveston, Tex., and the results obtained by him not only bear out this statement, but actually surpass it, he having obtained an average candle power of 5.90 per gallon. This goes to show what is attainable under good conditions and competent manipulation. The gas is slightly weaker and is more sensitive to low temperature, and will part with more illuminants by condensation. Owing to an excess of sulphur the cost of purification is somewhat increased, perhaps 15 or 20 per cent. In making the gas it will deposit more carbon on the checker-brick in the carburetter and requires a lower temperature in the superheater than Eastern oil. A high temperature in the superheater will convert the light oil fractions into lampblack, and also produce naphthaline in quantities both aggravating and expensive.

Analysis of the Beaumont Oil.—By E. P. Schoch, of the University of Texas, January, 1901. Oil from the Lucas well, temperature 60° F., specific gravity, 0.916 = 23 B. Fractions, ordinary distillation without reduction of pressure:

Degrees F.	Per cent. of yield by volume.	Color.
212 to 320	1.78	Clear white.
320 to 410	6.41	Light straw yellow.
410 to 464	6.88	Deeper "
464 to 500	12.14	Deep yellow.
500 to 680	18.65	Light red brown.
Above 680	44.64	Dark brown.
Residue	4.24	
Loss	5.26	

NOTE.—At 311° F., a white sublimate appeared in the condenser, probably sulphur. At 338° F., sulphureted hydrogen fumes were quite strong. From 572° to 662° F., scarcely any distillate.

This was one of the first analyses made of the oil, and the results have been confirmed by many analyses made since that time. The specific gravity of the oil ranges from about 0.9210 to 0.8974, equal to 22° to 26° B. Different samples of the oil have developed B. T. U., as follows:

1.—19,060.....Working test.
2.—19,574.....Laboratory test.
3.—19,785..... " "

Mr. Wm. B. Phillips, Director of the University of Texas Mineral Survey, in a letter recently published, says: "In the laboratory of this survey we have made many analyses of the Texas oils and have determined the sulphur with extraordinary care. We found that in the Beaumont oil the sulphur varies from 1.75 to 2.40 per cent., the average being 2.09 per cent."

I will now leave the subject with the convention, trusting that other members will be able to add largely to what is herein presented.

Discussion.

The President—Gentlemen, you have just heard a paper read upon a topic which is probably of as much importance to the gas interests of this day as any other subject now before us. We know that Texas oil has already exerted quite an influence on the market, although the development of the field is not much over a year by the records, because of both its quantity and quality. I think it is extremely desirable that the Association should bring out in the discussion of this subject all of the facts, information and figures that we can. Many of us are either using or considering the use of Texas oil, and we want to know whether it is advantageous to use it or not. I will ask Mr. Doty whether he has any information, direct or indirect, either from himself, or from the companies that he is connected with, in respect of Beaumont oil.

Mr. Doty—I regret to report I have had no informattion upon the subject, except that which I have gleaned here while at the works of the New Orleans Lighting Company. I learned from the Superintendent that the use of oil was fairly satisfactory. The increased quantity of sulphur requires additional purifying capacity, but with this out the use of the oil is encouraging.

The President—Perhaps Mr. Marshall could advise us in the premises?

Mr. Marshall—As I was only elected to membership to-day, I must learn to creep before I walk. I do not know much practically about the question, but as Dr. Doty remarked the oil is quite satisfactory. I am in favor of it. We are getting candles per gallon almost equal to gas made from Pennsylvania oil; the only objection is as to purification, and we are overcoming that. At the start in running with Texas oil, the oxide seemed to get hard and settled, and I am changing the purifiers more often than before, perhaps 3 or 4 times as often; but it is a fine oil. I would like to have some of the members visit the works and then I can show them actual results.

Mr. Cowdery—I understand that in Chicago they find no great difficulty in using the oil. The only thing peculiar to its use was that a higher heat was carried in the generators or carburetors.

Mr. Doty—What is the cost of the oil in Chicago?

Mr. Cowdery—I do not know as to that.

Mr. Shelton—I do not want it inferred from what Mr. Marshall said that the change of purifiers is in the ratio of 4 to 1 in the use of Texas oil. We are not only using the Texas oil but also are making departures in many direction. We are changing our plant apparatus and are doing an enormous business on the outside. We have not concentrated attention to the use of Texas oil, nor been able to make the comparisons which we would under settled conditions. If Mr. Marshall has changed boxes 4 times as often as he used to, it is because it was best to do so, all of his work and plant reconstruction considered. I feel that our purifying changes have occurred about twice as often as before when using gas oil, but our conditions are not settled, nor is routine established. It is not representative of Beaumont oil to change once a week instead of once a month. At the Staten Island (N. Y.) works, with which I am connected, we swung over to Texas oil the middle of last winter (January, I think), getting the oil shipped to Pennsylvania, on the Delaware, where it was put on tank cars and sent to Staten Island. The gas company there had been using gas oil, but dropped it, and having made another storage tank for Texas oil, took up with the latter with the utmost ease and comfort. I am frank to say I was much pleased with the easy way in which the change was made. I visited them and asked them how they got on, expecting to hear reports of trouble. They did not admit any trouble or any difficulty. They said they were doing very well by watching their heats a little more closely. They are changing boxes about twice as often as before. We commenced to use Texas oil in New Orleans in February, and have used nothing else from that time to this. I entirely confirm Mr. Marshall's statement, and believe it is the right thing to use, if the freight rates permit. The general efficiency of the oil seems to be a range of 85 or 90 per cent. of the oils that we have been accustomed to. A number of trials and experiments have borne that out. It is what I found in the two works that I have spoken of, using it right along. We did not find a great amount of tar modified the heats in the generators, and change the boxes once and a half or so, oftener than heretofore. You can find out what the Texas oil costs at your doors. It is simply a matter of calculation as to whether it will pay you to use it in comparison with the oils that you have been using. You need have no complaints of sulphur, because the gas can be purified in the works, and the oil can be handled readily in good apparatus. In many sections, you can get it for less than the Pennsylvania and other oils, and it is a great boon to the gas business.

Mr. Doty—The gas is a little weaker, and as it is more sensitive to a low temperature it will part with more luminosity. Did Mr. Shelton experience at Staten Island the induced physical condition of gas to conform to the statements of the writer? Is ours liable to become flabby and blow out?

Mr. Shelton—It has not proved soft with me. It is not flabby; it has as much blue or water gas in it as other water gas. It is of the same cousinship as any water gas. It has all the characteristics of usual water gas. I have not noticed any special difference from the gas made from any other oil.

Mr. Cowdery—I would like to ask Mr. Shelton, or any other gentleman who used the oil, as to its being fresh from the wells, or whether it is settled sufficiently to remove a portion of the residuum and water.

Mr. Fitzgerald—All of the oil we get is obtained direct from the wells. Occasionally we get a car with considerable residuum. As a rule, however, there is very little, and the cars empty completely.

Mr. Jenkins—We had some experiences at San Antonio with Beaumont oil. Our first experience was that we ran the heats too high, and found in a very few weeks that our carburetor was full of coke; that is, it caked up entirely. Then we could not force the gas through at all. But after getting them refilled, we have had practically no trouble since that, except the difficulty of purifying, which fault was entirely due to the smallness of our purifiers. Our Company, being interested in the use of Beaumont oil, arranged with Mr. B. E. Chollar, of St. Louis, to have Mr. Thwing come down and make experiments. It was under his direction that some experiments were made. The Beaumont oil was taken from the tanks and burned in the experimental retorts. And here is the result of the experiments, as follows:

Test of Beaumont Oil from San Antonio (Tex.) Gas Company.—Oil taken from Water Gas Tanks.—Oil Burned in Experimental Retort.—Residual oil, 60 per cent. coke, about 1¼ ounces per quart, or 6 ounces per gallon. Specific gravity of residual oil, 24° B. Calorific value of gas, 1,142 B.T.U. per cubic foot.

Sulphur by Eudiometer Test.—(1.) HS, .7; CO, .7; (2.) HS, .7; CO, .8; (3.) HS, .6; CO, .8.

Test of San Antonio Gas made from Beaumont Oil for HS and CO, with a Chollar Eudiometer, using ASO und KOH.—We purified gas from water gas relief holder:

Per Cent.	Per Cent.	Per Cent.	Per Cent.
HSO.... .8	HSO.... .8	CO....7.8	CO....7.9
" 9	" 7	" 8.1	" 8.0
" 8	" 8	" 8.2	" 7.8
" 7	" 9	" 8.2	" 7.6
" 8	" 8	" 8.0	" 7.6
" 9	" 8	" 8.1	" 7.7
" 8	" 7	" 8.0	" 8.1
" 8	" 8	" 8.0	" 8.2
" 8	" 8	" 7.9	" 8.2
" 8	" 9	" 8.0	" 7.9
" 9	" 8	" 8.0	" 8.0

Average, HS, 8 per cent.; CO, 7.95 per cent.

Calorific Value of Beaumont Oil in Gas made by San Antonio (Tex.) Gas Company.—Junker's Calorimeter.

B.T.U. per Cubic Foot.									
633	630	620	625	630	636	625	630	625	635
633	642	625	630	636	630	630	630	635	625

Average of 20 tests, 630 B.T.U. per cubic foot.

An average of a large number of tests at Station B, Laclede Company, St. Louis, Mo., gives our coal gas, 710 B.H.U. per cubic foot, and water gas from 600 B.T.U. to 760 B.T.U. per cubic foot, which heating value is apparently governed by the number of gallons per 1,000 of oil used. We had no special difficulty in the case, except for the first three months. We did have trouble last winter. When the houses were closed comparatively tight in the winter, from time to time we had trouble over sulphur, but we expect to be able to overcome that difficulty before next year. We are using the oil now with very great satisfaction.

Mr. Norris—I feel some little hesitation in speaking from a rather limited experience in the use of oil, but there are a few facts that I would like to emphasize which have been brought out by the other speakers, and I would also like to give some definite figures showing the difference between Texas oil and ordinary oils. In making gas from Texas oil it is necessary to have a smaller range of temperature in the fixing chambers. The Texas oil, having a different base from the paraffine oils of Pennsylvania and Ohio, breaks up differently, and with excessive heat gives an unusual amount of lampblack and naphthaline. In regard to the permanence of the gas, the two oils being of a different base, it is found that the illuminating value of the gas made from the Texas oil comes more largely from the benzene series of hydrocarbons. Analyses show that for equal candle powers the proportion of heavy hydrocarbons in gas from Beaumont oil is about 75 per cent. of what it is in gas made from Ohio or Pennsylvania oils. The result is that the gas made from the Texas oil loses its candle power more readily under the influence of low temperature.

The President—Your reference to Texas oil is exclusively that from the Beaumont field.

Mr. Norris—Yes, exclusively to Beaumont oil. The following figures are based upon experiment, but are not given as being anything but approximations. Now the amount of light in the ordinary gas oil contains about two tenths of 1 per cent. of sulphur; Ohio crude oil contains about four-tenths of 1 per cent.; and Beaumont crude in the neighborhood of 1¾ per cent. The crude gas made from gas oil contains, in the form of sulphuretted hydrogen, about 125 to 175 grains of sulphur per 100 cubic feet. In gas from Texas crude it is somewhere about 350 grains of sulphur to each 100 cubic feet of gas. These figures, while larger than in ordinary water gas, are not excessive. Coal gas made from West Virginia coal contains as high as 900 to 1,000 grains, or somewhere in the neighborhood of 3 times as much as gas made from Texas oil. There is another phase of the sulphur question which I will only touch upon for reasons that you will understand, and that is the amount of "sulphur in other forms" in the purified gas. Gas made from Texas oil contains considerable more of this sulphur, which is not removed by the ordinary methods of purification. A thing I would like to see brought out is whether there is available commercially any form of Texas oil which differs from the crude oil on the market; that is, a gas oil, or any form of distillate which contains less sulphur than crude oil. We hear frequently of "desulphurized oil," and I want to know what is mean by it. If there is any such Texas gas oil on the market can anybody give me the amount of sulphur it contains, and the amount of sulphur in the purified gas made from it?

Mr. Doty—I would like to ask some questions. The figures presented by Mr. Jenkins, as to the yield of gas and candle power of the Beaumont oil from the St. Louis experiments, are most surprising, because the yield per gallon in one experiment is 26.44, and the candle power is 53.54. Our product of oil gas is an average of 70 cubic feet per gallon of 60-candle power per cubic foot. That is something like 3 or 4 times the value of Beaumont oil gas is; 5½ candles could not be obtained from Beaumont oil if this figure is correct.

Mr. Shelton—I think Mr. Doty had better question the figures! There is a great deal of truth in the saying that the "Proof of the pudding is in the eating of it." The simplest way for you, gentlemen, to satisfy yourselves of the characteristics of gas made with Texas oil is to go to the gas works; or, when you go to New York on your annual recreation trip, visit Staten Island and see them running for months in a cold weather climate, and take their results. In brief, the volume of make and the candle power is from 10 to 15 per cent. less than usual results. That is it in a nutshell. Add to your oil estimates 10 or 15 per cent. in quantity, for the use of Texas oil, and you will make the same quantity and quality of gas from the Texas oil as before. If that is so (and the facts show it), there is no such absurdity in the candle power produced, or the illuminating quantity, that these figures from St. Louis would indicate. There must be some mistake in these figures now presented as to the value of the Texas oil producing capacity, because they are not within miles of it!

Mr. Jenkins—The "proof of the pudding is in the eating," as Mr. Shelton says. We introduced it on a small basis, and on our moderate output it would average about 4¾ gallons of Beaumont oil on 19-candle power gas. The test of Mr. Thwing was not for gas produced or candle power, but to find out the amount of sulphur and the CO. We had trouble with the gas for a while which prevented us from using it, and these experiments were made to ascertain the impurities of this gas and not the candle power or the quantity of gas produced, but simply what we get out of a certain amount of oil in a small heater.

The President—Mr. Jenkins may answer Mr. Doty's question with regard to desulphurized oil.

Mr. Berkley—By reason of our inability to get other oil, and also desiring to try the Beaumont oil, we used some of it in a different manner than I have heard of it yet being tried; that is, as an enricher, using the ordinary coal gas retort. While we did not get the same results as from some gas oil previously used, we did get such results as would warrant it being used on a larger scale under proper conditions.

The President—I will say to Mr. Norris that the Guffey people are installing a plant and are putting out a circular stating the different kinds of oil to be furnished. They are going to have gas oil among the others named. We would like to hear from Mr. Collins.

Mr. Carroll Collins—The main difference that we find is we cannot make quite as much per hour from Texas oil as we did with the other oil. Instead of using ordinary gas oil that we got from the north, we used the Texas oil in Corsicana, and the result was such that the candle power dropped and we have to use a little more oil. From our character of work at Corsicana, the output is very small. We run from 7 to 8 months before we change the work in the carburetors, and we make from 40,000 to 45,000 feet a day.

Mr. Norris—One word in addition. The fact has been brought out that with our present methods and apparatus the Texas oil has a value of about 85 per cent. of that of the old oil. I do not regard this difference as necessarily final. I do not see any reason why, with further experience, and, if necessary, with re-designed apparatus we should not get as good results from the Texas oil as from the Pennsylvania or Ohio oils. Everything that has been done in Beaumont oil has been done in apparatus designed for handling other oils and by methods necessarily based on experience with these other oils, so I do not think we should be finally satisfied until we get from the Beaumont oil results at least as good as those now obtained from the Ohio and Pennsylvania oils.

Mr. Goodnow—The question of using this oil in this part of the country is generally felt to be of great interest, and I would like to know whether it has been brought out. I understand that in California crude oil is used in a generator in lieu of coke and hard coal, but it never has occurred to me that the Texas crude oil could be used in that way. I would like to hear if that has been done.

The President—You mean in a generator of coal gas furnaces?

Mr. Goodnow—No; as a coal gas set. I understand in California such machines are made, and the oil used in that way.

The President—A party in San Francisco claims to have a machine to do that, and I understand it is being installed in some places.

Mr. Goodnow—I understand they are making a water gas generator and using oil in the generator instead of hard coal.

Mr. Norris—It seems to me that any gas suggested would be oil gas and not water gas.

The President—You must understand their use, but they use oil in one way or the other.

Mr. Steinwedell—I think that the thing meant to be brought out is that they use the oil to heat the carburetor and superheater during the blows.

Mr. Shelton—I think the understanding of Mr. Goodnow is not quite correct. I think he means an old semi-oil process in which, instead of heating the generator from anthracite, it is filled with firebrick which are made hot by burning oil underneath, with an air draught through thus getting them red hot. Gas is made by shutting off the air and re-adjusting the oil supply, with which some steam is admitted. The stored up heat in the brick disassociates the steam and the hydrogen unites with the carbon from the oil instead of from the usual hard fuel. The result is carburetted hydrogen but made from expensive carbon; that is, oil. The process has been vamped and revamped for a number of years. The West has had its fingers burned by it the same as the East. The trouble with the process is that it makes a rich oil gas and dilutes it down, instead of making a blue water gas to be enriched up. It is hard to avoid making lampblack and tar, and when the price of oil goes up, it knocks economy higher than a kite. That is the form spoken of; it has been used for 20 years. I think Mr. Goodnow should go very slow in thinking that he will get good results from the substitution of oil for hard fuel in a water gas generator.

Mr. H. K. Stephens—I have one of these generators in use myself. As you get up your heat you get your fire with steam and oil together, which heated both sides of the generator. You stand in front of the generator and on the other side is the superheater. As you send it down, you send it out through the seal. It is about the same process, and is a very costly way of making gas.

Mr. Egner—The train on which I came to New Orleans having been over 3 hours late, I was unable to be present at the opening of this meeting, and having just come in, I did not hear if the question upon a point that ought to be explained has been asked. If it has been, then I ask to be excused, but if not, then I think the subject ought to be stated in plainer language. Mr. Fitzgerald said I believe that they made 5.25 candles per gallon per 1,000 cubic feet. Maybe I am exposing my own ignorance by asking the question, but I will admit that I cannot gather any meaning out of that statement as to the value of Beaumont oil for gas making. And I would be pleased to know what Mr. Fitzgerald means by saying that the candle value of the oil is 5 to 5.25 candles per gallon per 1,000 feet.

Mr. Fitzgerald—The meaning I attach to that is this. If you use 4 gallons of oil per 1,000 cubic feet made, and produce a 20-candle gas or use 5 gallons and produce a 25-candle gas, I should call it 5 candles per gallon per 1,000 feet.

On motion of Mr. Shelton, a vote of thanks was tendered Mr. Fitzgerald for his paper.

The President then called upon Mr. F. H. Shelton, of Philadelphia, to read his paper entitled,

CURRENT PURIFIER PRACTICE, AND A NEW FORM OF CONSTRUCTION.

Dry Center Seal.

The purpose of this paper is to briefly review, for convenient reference form, purifier construction practice in the United States, as well as to describe an easily made form for ordinary boxes, that under some conditions at least, will reduce the expense of construction about one-half. To that end I will consider:

a. Past and present usual practice.
b. Variations of the usual forms.
c. Proposed forms, not as yet adopted.
d. A cheap construction for the standard form of purifier.

It may be as well to state clearly, moreover, that this paper is not undertaking to deal with the various *processes* proposed for gas purification, such as the Claus, or Valon's oxygen process, or Cooper's coal liming process, but merely with the mechanical arrangement or construction of the equipment used for the well-known lime or oxide process of gas purification.

Past and Present Usual Practice.—The first purifying agent used was lime, and this, according to "King's Treatise," was first used in 1806 by Samuel Clegg, one of the early English gas engineers, who

dropped it into the bottom of the gasholder tank. It may be imagined that its efficiency so used was not very great. In 1809 a paddle was added to stir it up, and shortly after, according to Peckston's "Practical Treatise," 1819, the first distinctive purifying box was shaped out—the wet lime purifier. This, as you know, is a vessel, or a series of vessels, partly filled with lime water or cream of lime (with agitating arms) through which the gas is passed. The principal English cities had gas introduced along about 1820 to 1825, and at that time the wet lime purifier was the standard outfit.

Fig. No. 1 shows a common arrangement of 3 in a row, with a lime water feed tank, while Fig. No. 2 shows a construction wherein 3 levels of lime water are used, one over the other in the same tank. Wet lime purifiers were usually made from 5 to 15 feet in diameter. They did the work all right, in fact, would purify twice as much per bushel of lime as the later dry lime boxes—1 bushel and 50 gallons of water purifying some 20,000 feet—but the labor of charging with the back pressure is somewhat increased, and the resulting spent lime, or "blue billy," is rank stuff, very hard to get rid of.

In 1823 Reuben Phillips patented the idea of using lime in dry form on perforated shelves, and in the same year John Malam made a regular set of 4 dry boxes, connected with a wet center seal. Such was the beginning of the usual purifying boxes, and from that date to this probably 95 per cent. of the world's gas purification has been done on the same principles and with the same general mechanical arrangements—without change, excepting as size and convenience have made changes in details. In 1840 dry lime purifiers in England were in full swing.

The early works in the United States no doubt had some wet lime boxes, although I have not run across any records of such. In later days various arrangements of wet lime purifiers have been tried, especially by the United Gas Improvement Company, at Yonkers, Savannah, etc., but satisfactory results have not ensued and wet lime purification has been generally and practically totally abandoned, excepting for one conspicuous instance. The Boston Gas Light Company, in 1860 and 1870, erected 12 wet lime purifiers that have been retained in use to date. The form of box, of which section is shown in Fig. No. 3, is unusual. Each is of wrought iron, rectangular, about 10 feet wide by 20 feet long, and about 2 feet deep. The gas entering one end, from 12-inch connections, travels in close contact over the service of the lime water in the first chamber, then over a baffle plate, then through the next chamber, and leaves by the outlet shown. The usual agitators are provided and the lime water level is adjusted to give 12 inches back pressure. Each box has a capacity of about 360,000 feet daily, and purifies about 36,000 cubic feet of coal gas per bushel of lime, or about twice as much water gas. In the main, however, as stated, purifiers in the United States from the beginning have been of the dry lime or oxide forms, and the usual types of rectangular box in groups are so familiar to the veriest tyro in the business that it is unnecessary for me to herein consume space in describing the conventional outfits. It may be well, however, to remind you that purifier settings are divisible into 3 well defined classes: (a) Ground floor or single stage settings, where the boxes are on the ground level, where no working operation is expected underneath the boxes, and where the purifying material is shoveled out sideways into barrows, and is not elevated on its return. Fig. No. 4 illustrates this plan; (b), 2-story settings, where the purifying material is emptied through the bottom of the box and elevated for refilling, as in cuts; and (c), 3-stage settings, where a third floor is provided *over* the boxes on which the oxide is also worked and from which it is dropped back into the boxes. The larger English works go in a good deal for this very complete but rather expensive setting. Fig. No. 5 illustrates a typical arrangement of the 3-stage settings. It is interesting to contrast this large and elaborate equipment and modern boxes, perhaps 40 feet square, holding 100 tons of oxide each, with the little, round, dry lime purifiers identical in principle, with which the small early works often began business, but now rapidly disappearing. Fig. No. 6 is from a recent photograph of such boxes still in use in a small New Jersey works. Probably the largest circular boxes were those put in at Beckton, when that great London works was built about 1870. These, since added to by modern boxes (and illustrated in "King's Treatise," page 415, Volume 1), were 41 feet, 6 inches in diameter each, and 6 feet deep. The cover was pushed up by a central ram, suggesting when up a large umbrella. The round box idea is bad, as it wastes floor space and prevents the using of interchangeable trays.

The lifting of the covers of the usual rectangular box is purely a mechanical question. In small boxes it is often done by a wooden crane or jib arm with a chain or rope hoist. In one set of small boxes the lids were hinged at one end, and merely up-ended. In medium size boxes lids are usually picked up by a chain hoist attached to a small trolley or carriage running upon an overhead beam or rail, hand power working the chain hoist. In large boxes power is usually brought to bear. In such case the overhead hoist may be used with a hydraulic cylinder to lift the load, or, as is more frequently the case, a travelling carriage, as in Fig. No. 7, straddling the boxes, and running on the floor level is used, with hydraulic, steam, worm gear, or other device for the actual easy lifting. In England, these large carriages are termed "Goliaths."

In the matter of connections, purifiers may be grouped into two classes; those operating from a central center seal or many-way valve, and those operated by various arrangements of separate single valves. Heretofore the general arrangement has been with the wet or dry center seal, all of the gas passing tandem fashion through 3 boxes in succession. With special center valves, such as the Mitchell, as built by Messrs. R. D. Wood & Company, or the Bahret, 4 boxes may be so used. In view of some objections, however, to large center seals a group in one casing of single valves to serve the same purpose is frequently used, such as the "Weck" pattern in England, Fig. No. 8, or the similar Berlin, as built by Messrs. Bartlett, Hayward & Company, in this country.

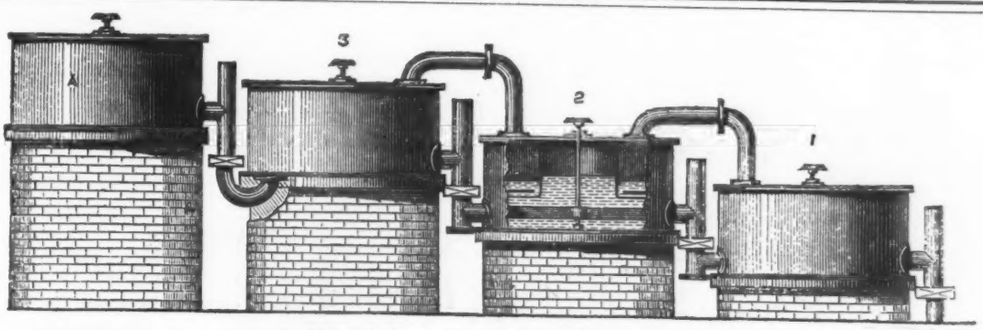
A growing appreciation, however, of the advantage of area and slow speed in purification, has led to a marked recent tendency to divide the stream of gas into sub-streams, sending each in parallel through but one or two boxes, uniting the streams in the take-off main. In such case, and for numerous other reasons, individual valves are usually used in many combinations. In fact, there are so many kinds and arrangements of valves, 4-way valves, center seals, and special forms and connections, that a paper on that subject alone could readily be written, and it is useless to herein attempt to go into detail. Yet attention might be called to a growing appreciation of the safety and cheapness of the plain, old fashioned water seal for purifier shut-offs, obviating the risks of leakage found in dry valves, and the difficulty and expense of repairing such. In England the Cutler form, as shown in Fig. No. 9, is attached directly to the box. In this country, Messrs. Bartlett, Hayward & Company, built a very simple and effective form of water seal; and a form so simple as to quite appeal to one, is shown in Fig. No. 10, where the "valves" are simply water filled or sealed return bends under the boxes, with nothing necessary but 2-inch water supply pipes and drains for handling them.

Variations of Usual Forms.—The regular practice of passing the gas through stationary masses of oxide has sometimes been carried out in quite unusual, ingenious and improved arrangements, according to local conditions and the opinion of the observer.

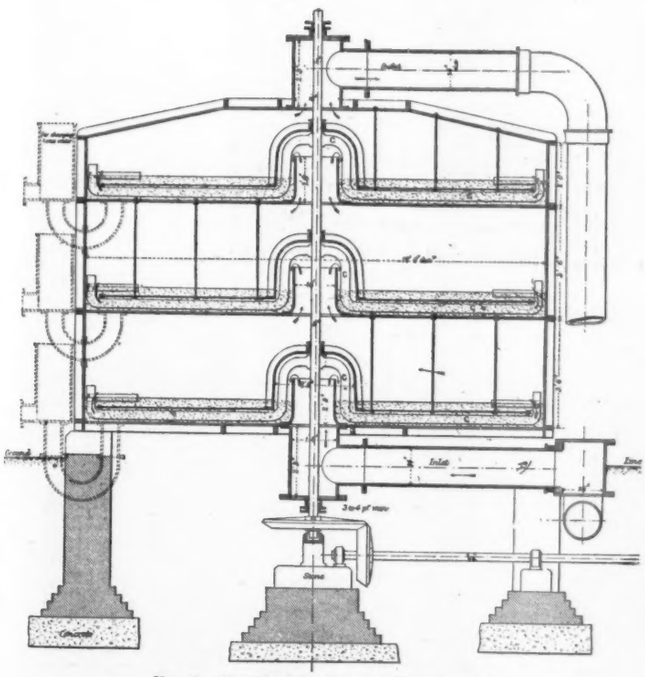
Mr. Donald McDonald, of the Kentucky Heating Company, built 2 purifiers inside of and under the crown of 2 small gasholders. The oxide was carried on a platform on stilts just above the water level. The holders were about 6 feet deeper than would otherwise have been the case, so that when grounded space would be left under the crown for the oxide chamber. The incoming gas had to pass through the oxide before reaching the holder storage space. To clean a box the holder had to be laid off, and entered through a 6-foot side door near the crown. The determining factors, as I understand, in the adoption of this design, were low first cost, and the saving of ground space. The arrangement is described in AMERICAN GAS LIGHT JOURNAL (Vol. 60, page 584), and "Progressive Age" (Vol. 12, page 159). While it worked well, I do not understand that any one has repeated it.

In 1897, Mr. Wm. R. Beal, of New York, in a short paper before the American Gas Light Association (Vol. 14, page 115, of the "Proceedings,") described a form of purifying box illustrated in Fig. No. 11, that has since been generally referred to as the Beal box, and, moreover, largely adopted. Its chief feature is the use of 2 beds of oxide in a box of considerable depth, introducing the gas between the beds and dividing the flow, each half passing up and down respectively, to the outlets. Slow speed, large oxide area, less floor space, reduced construction expense and other advantages are gained.

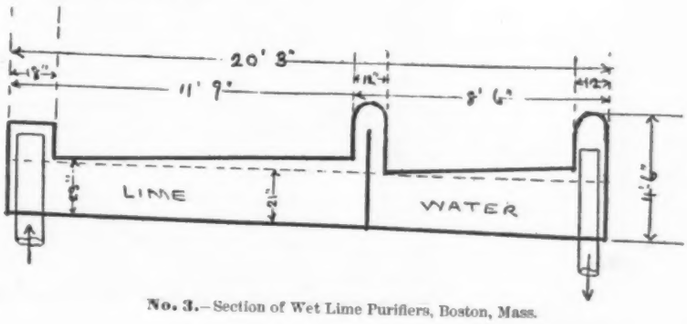
In 1898, Mr. Irvin Butterworth, in a paper before the Ohio Gas Light Association (AMERICAN GAS LIGHT JOURNAL, March 28, 1898), described "Still Another Purifying Box," known as the "Doherty-Butterworth" form. This distinctly original form, illustrated in Fig. No. 12, consists of 4 tapering, continuous walls of oxide with suitable oxide covering (in form similar to a small stone hut), contained in a sheet iron rectangular box, a few inches distant from the oxide on all sides. The entering gas envelops the oxide on all sides and passes through to the interior chamber from which the outlet pipe leads. The oxide is retained in the vertical wall form by parallel stationary slat structures, into the space between which it is shoveled from above. The points claimed for the box by Mr. Butterworth are: "No moving parts, no water seal, no large covers to



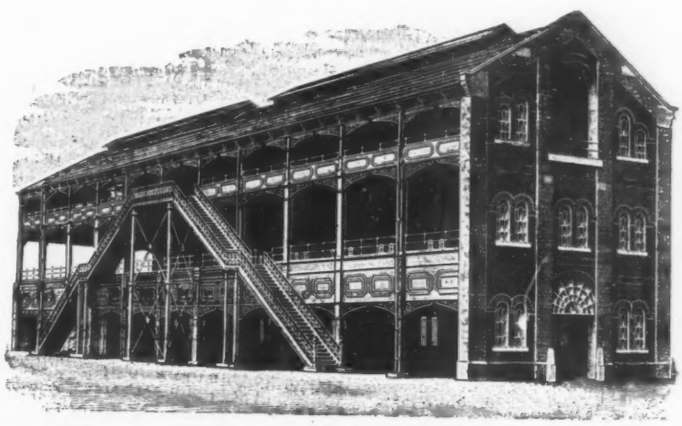
No. 1.—Three Wet Lime Purifiers with Feed Tank.



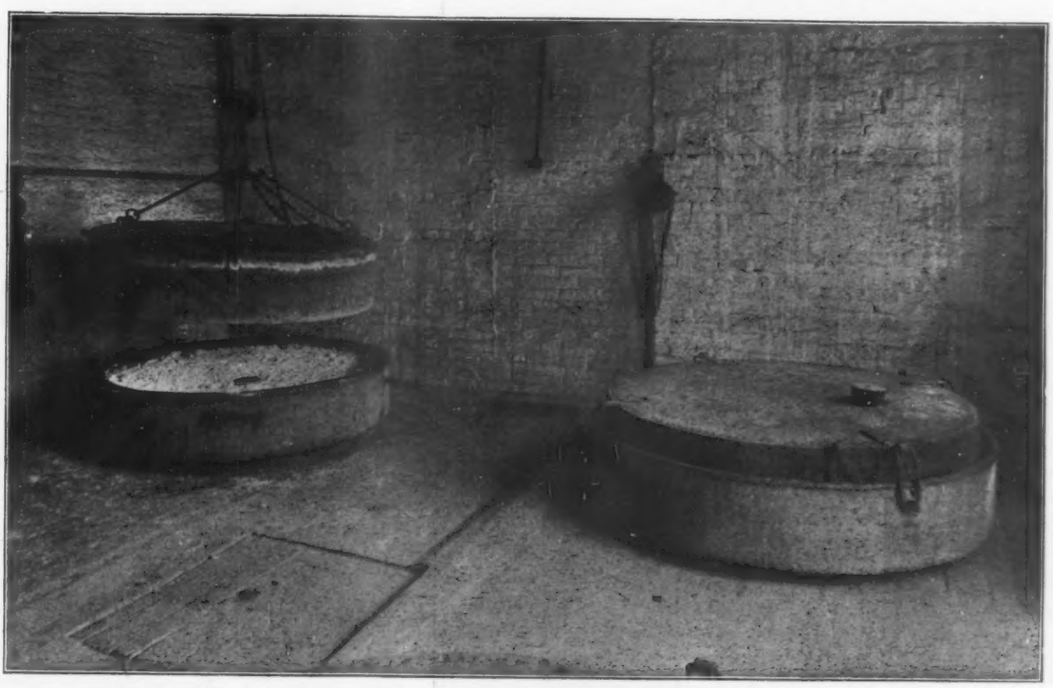
No. 2.—Wet Lime Purifier with Three Levels.



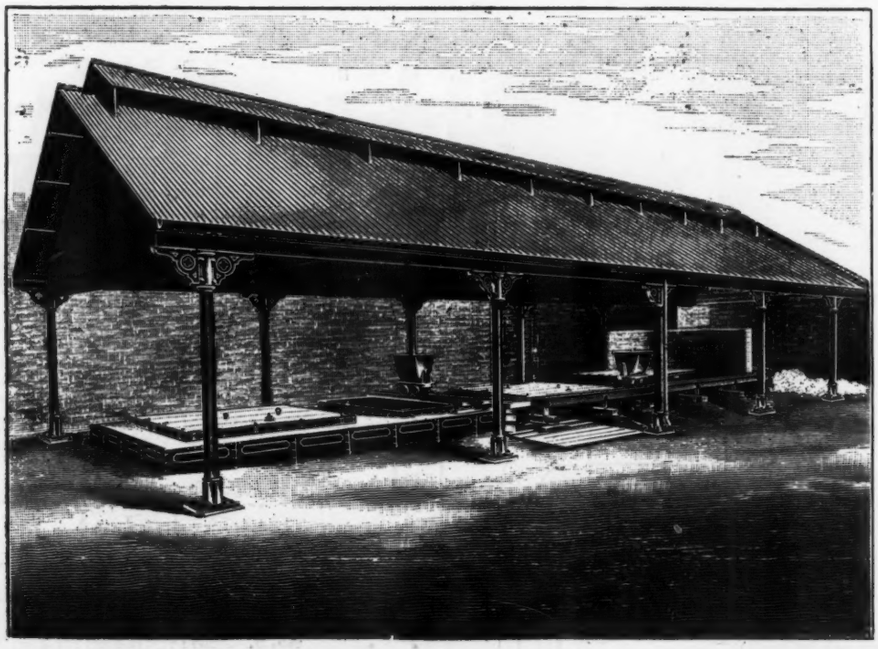
No. 3.—Section of Wet Lime Purifiers, Boston, Mass.



No. 5.—Three Stage Puri er Setting.

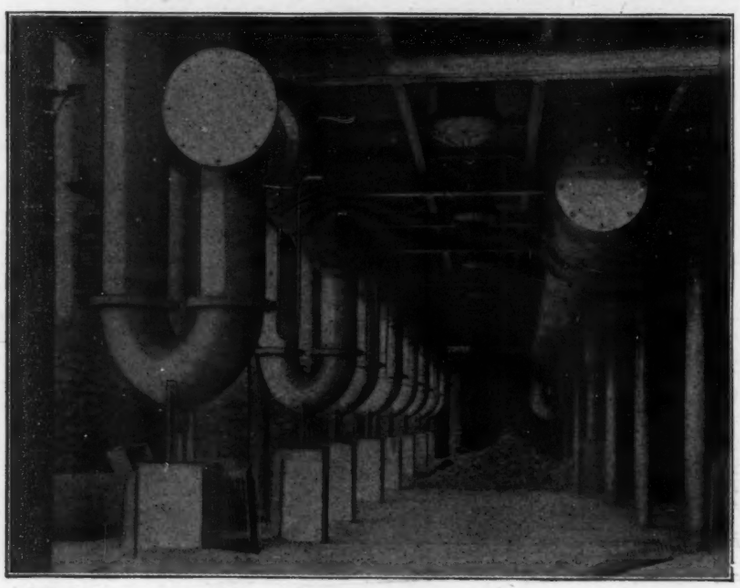


No. 6.—Early Dry Lime Purifiers, Round Form.

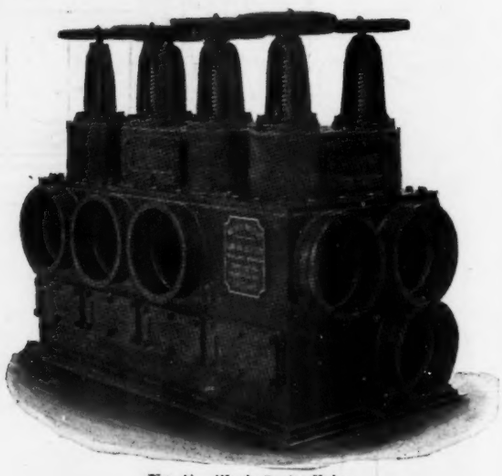


No. 4 —Ground Level or Single Stage Purifier Setting.

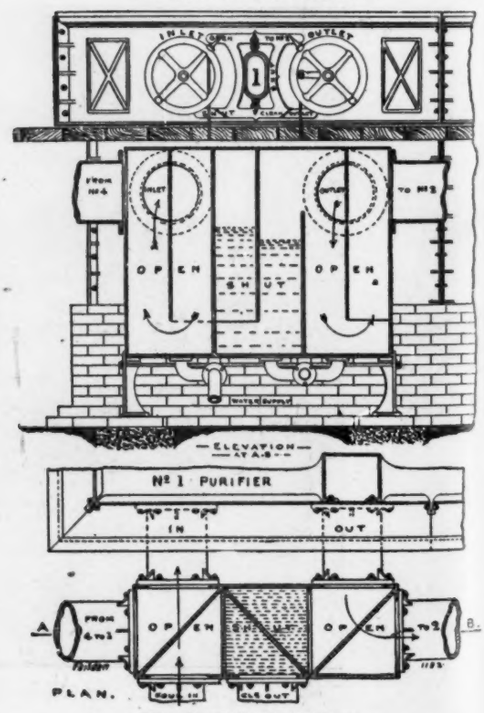
No. 7.—Usual Two Stage Purifier Setting with Travelling Carriage Cover Hoist.



No. 10.—Purifiers with Water-Seal for Valves.



No. 8.—Weck Center Valve.



No. 9.—Cutler Water Valve.

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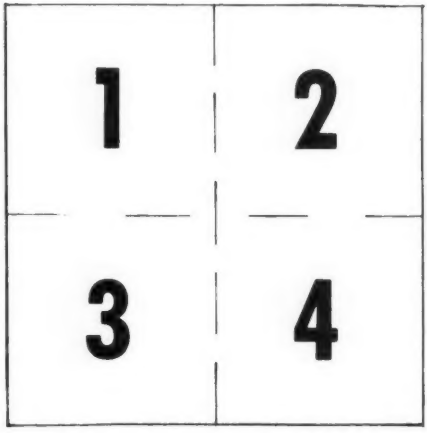

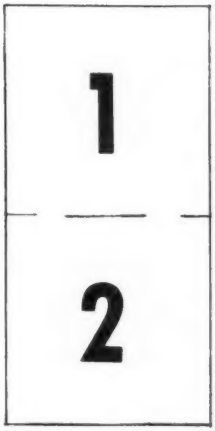

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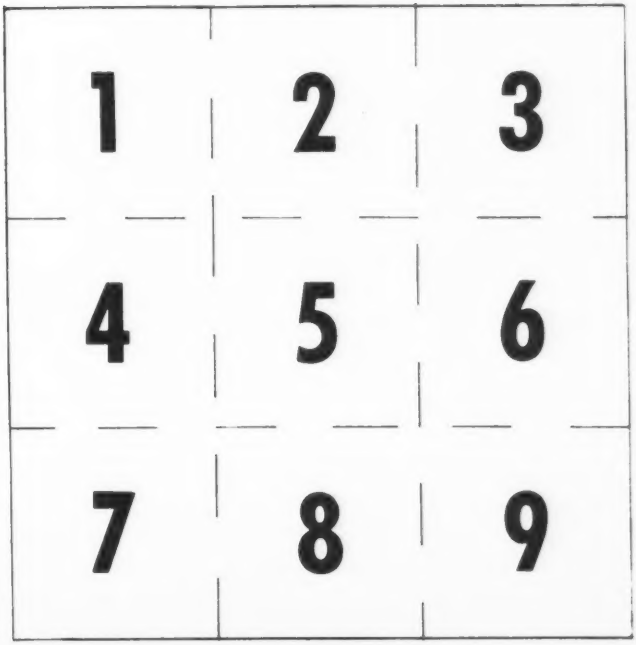

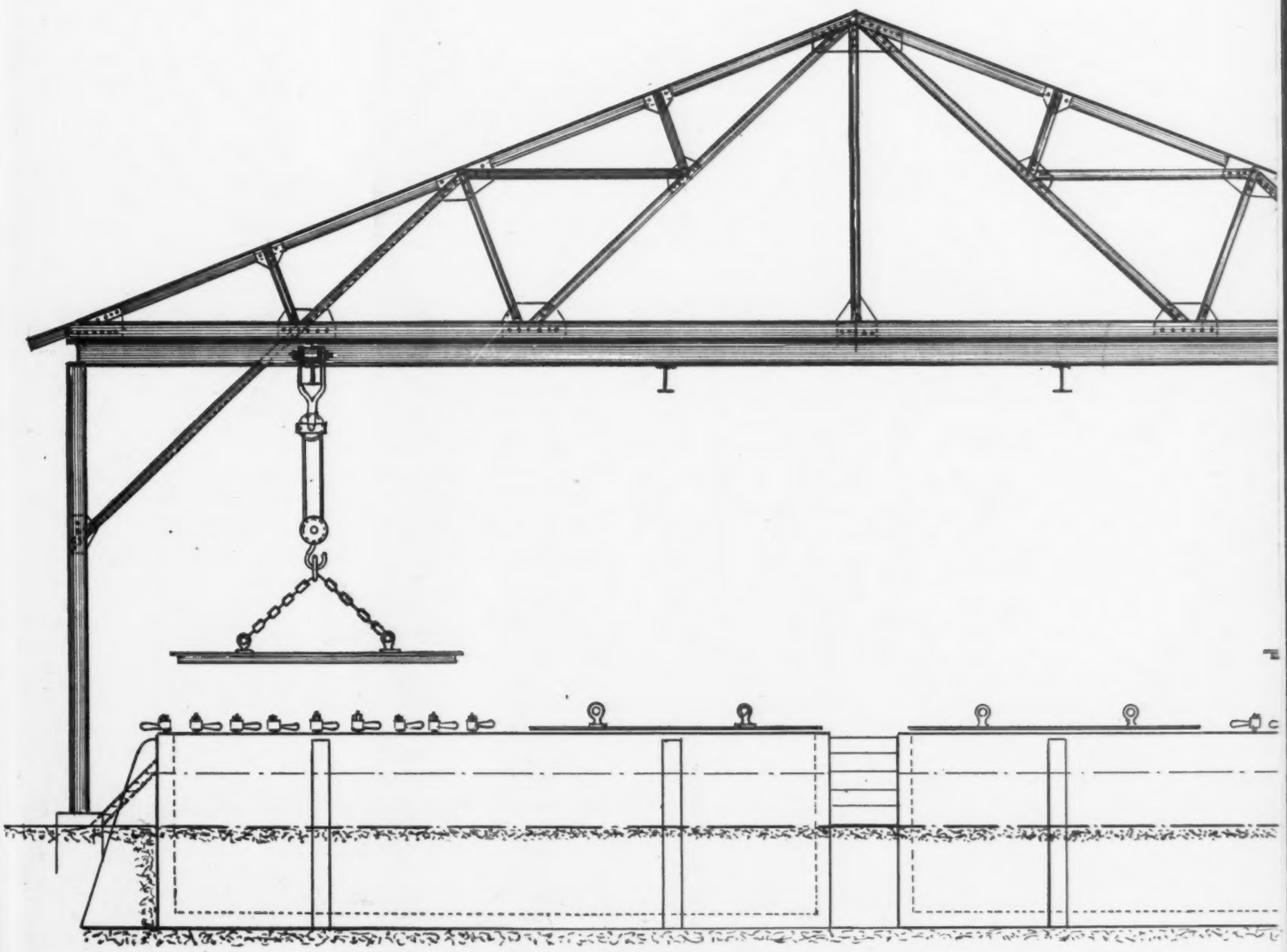

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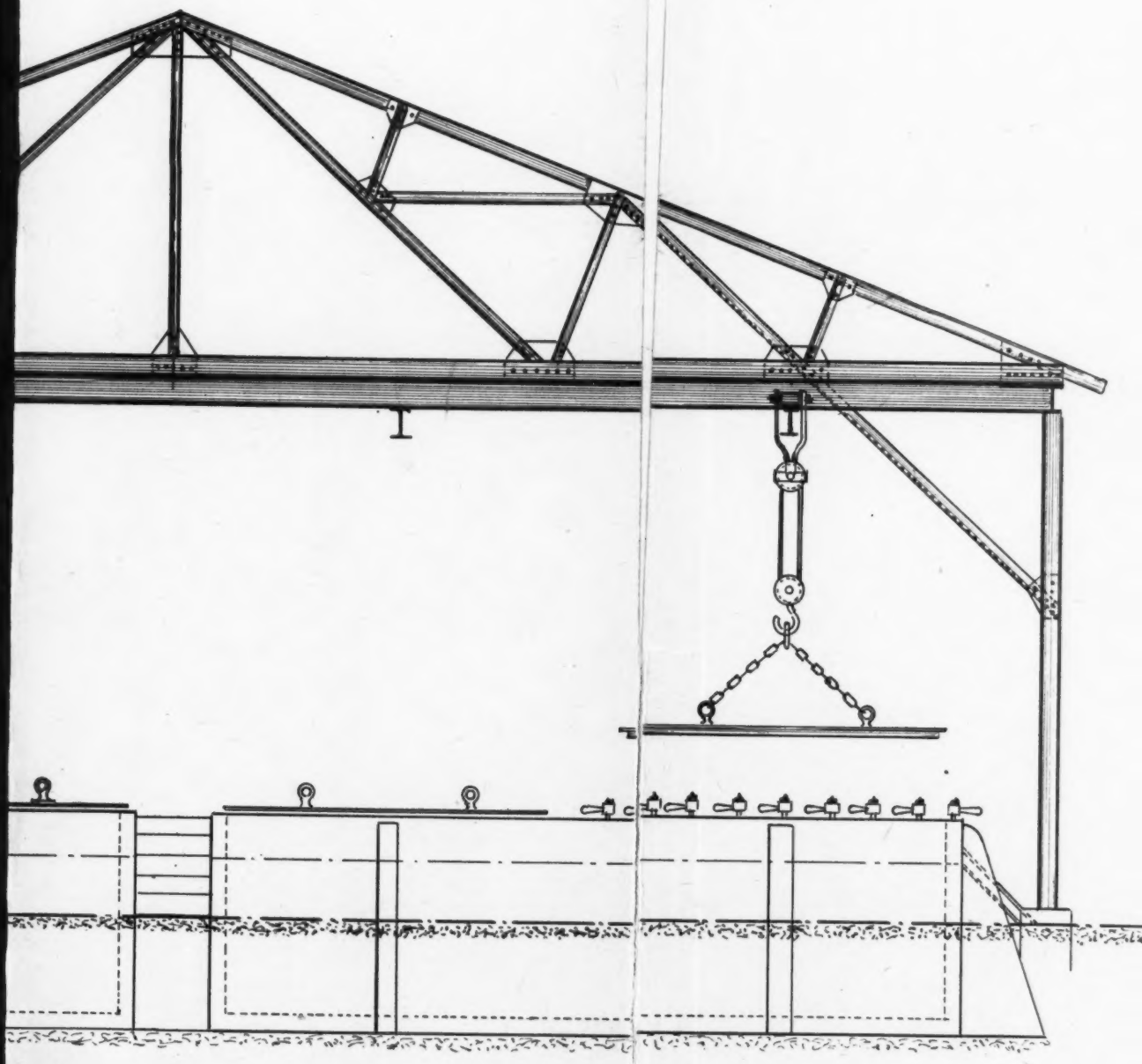
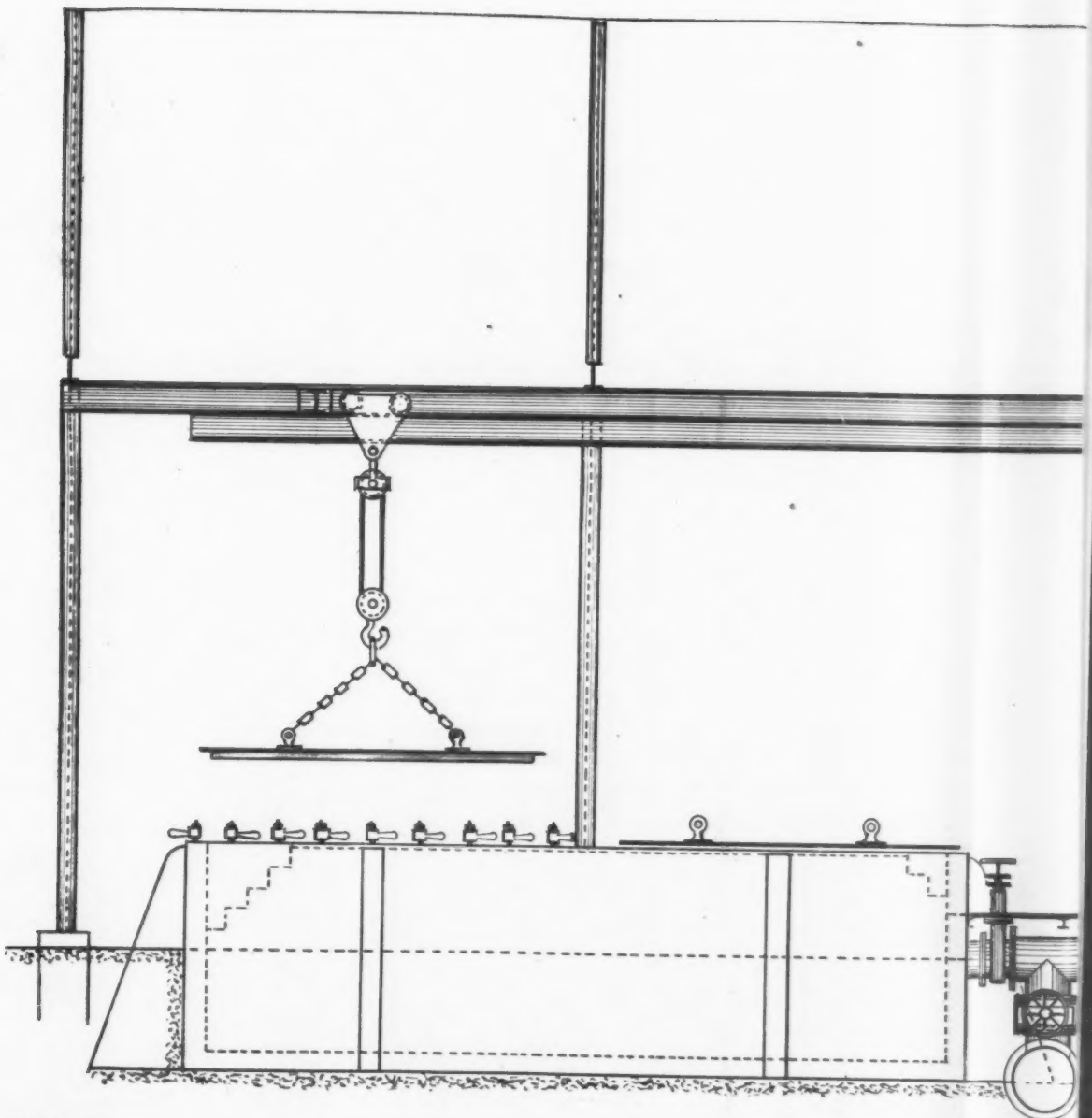
No. 22.—Elevation of Cement Purifiers, 25 feet by 25 feet by 7 feet with Dry Lute Covers.



of Cement Purifiers, 25 feet by 25 feet by 7 feet with Dry Lute Covers.



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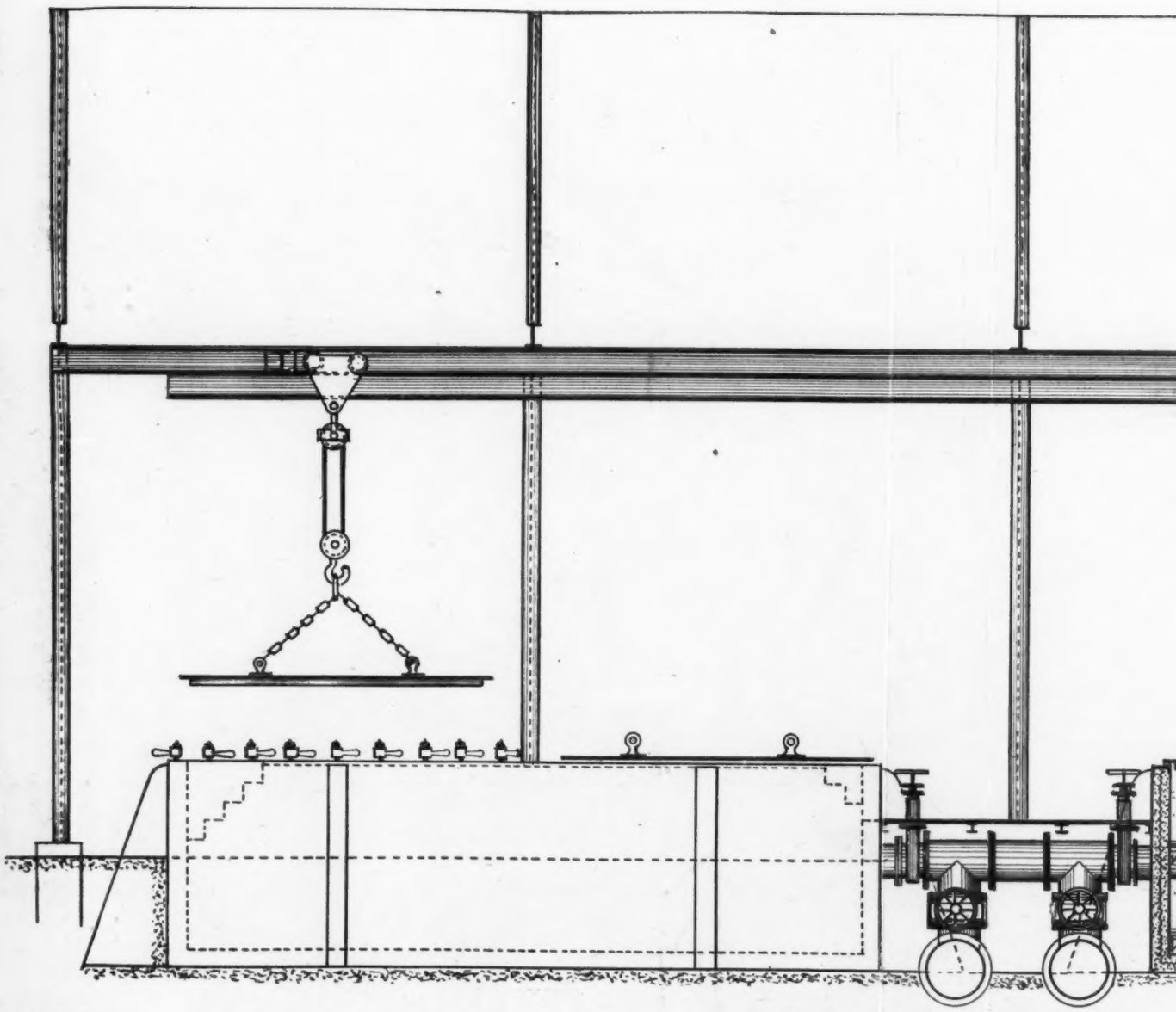
No. 23.—Elevation of Four Cement P



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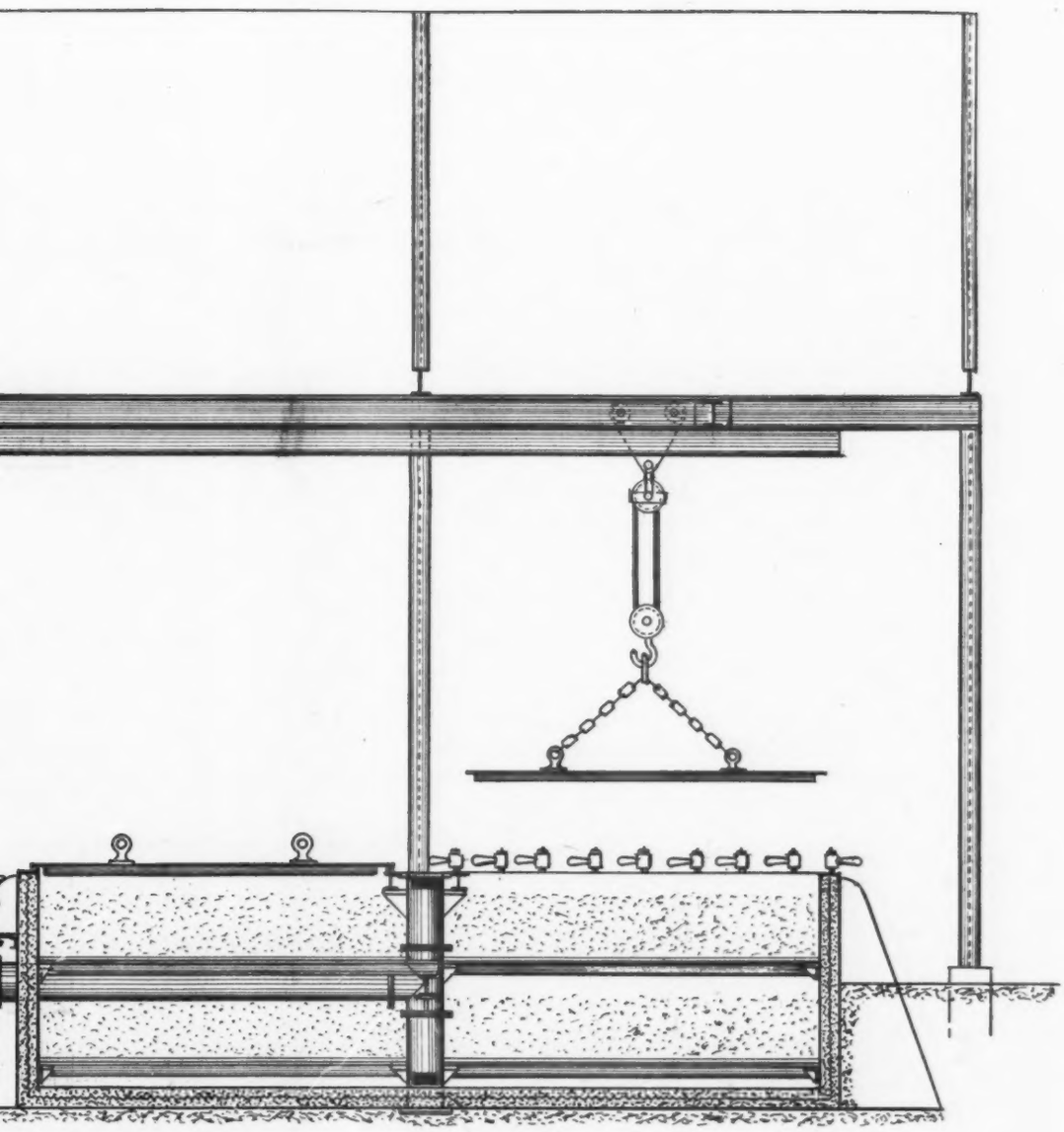
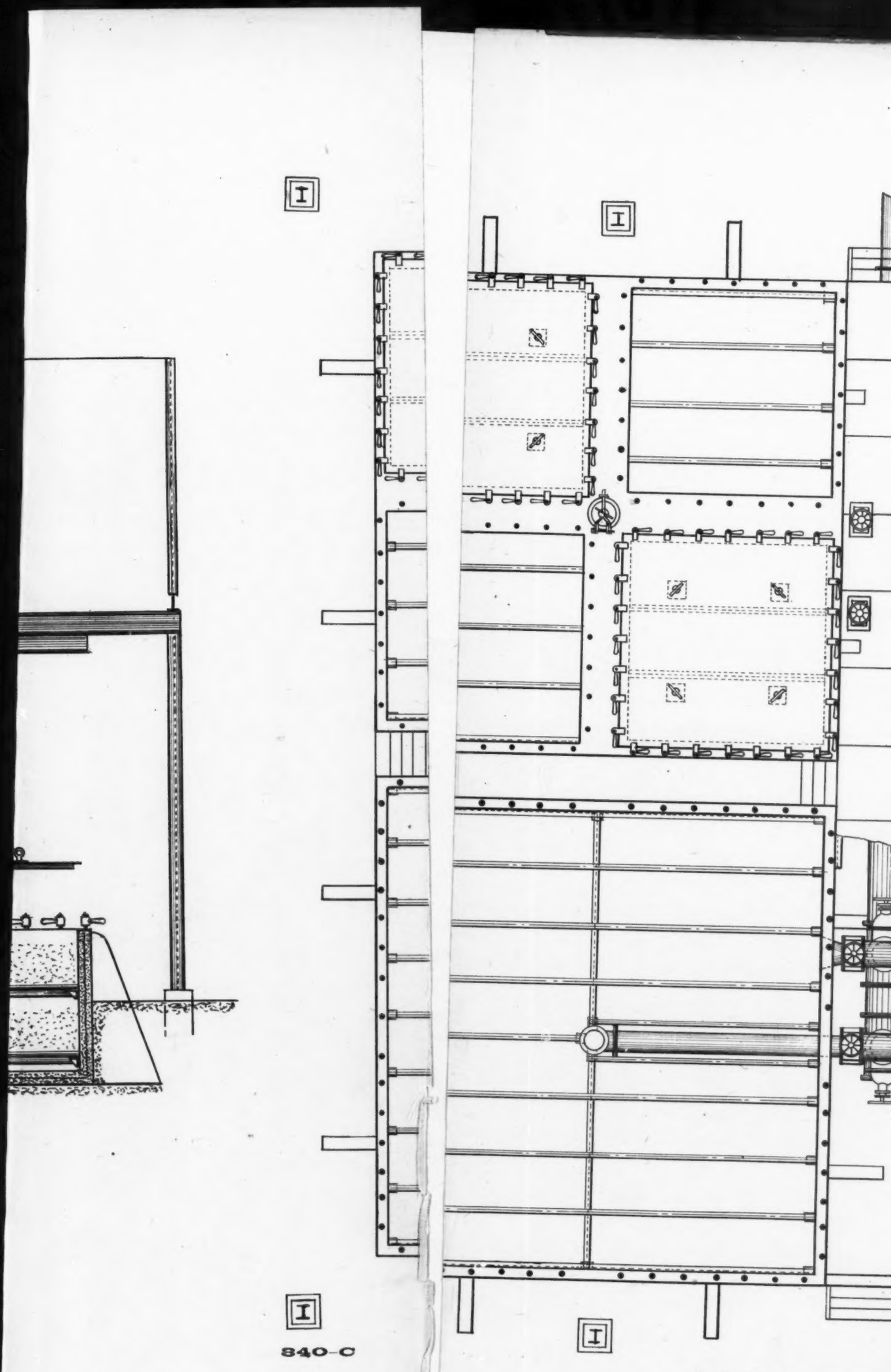
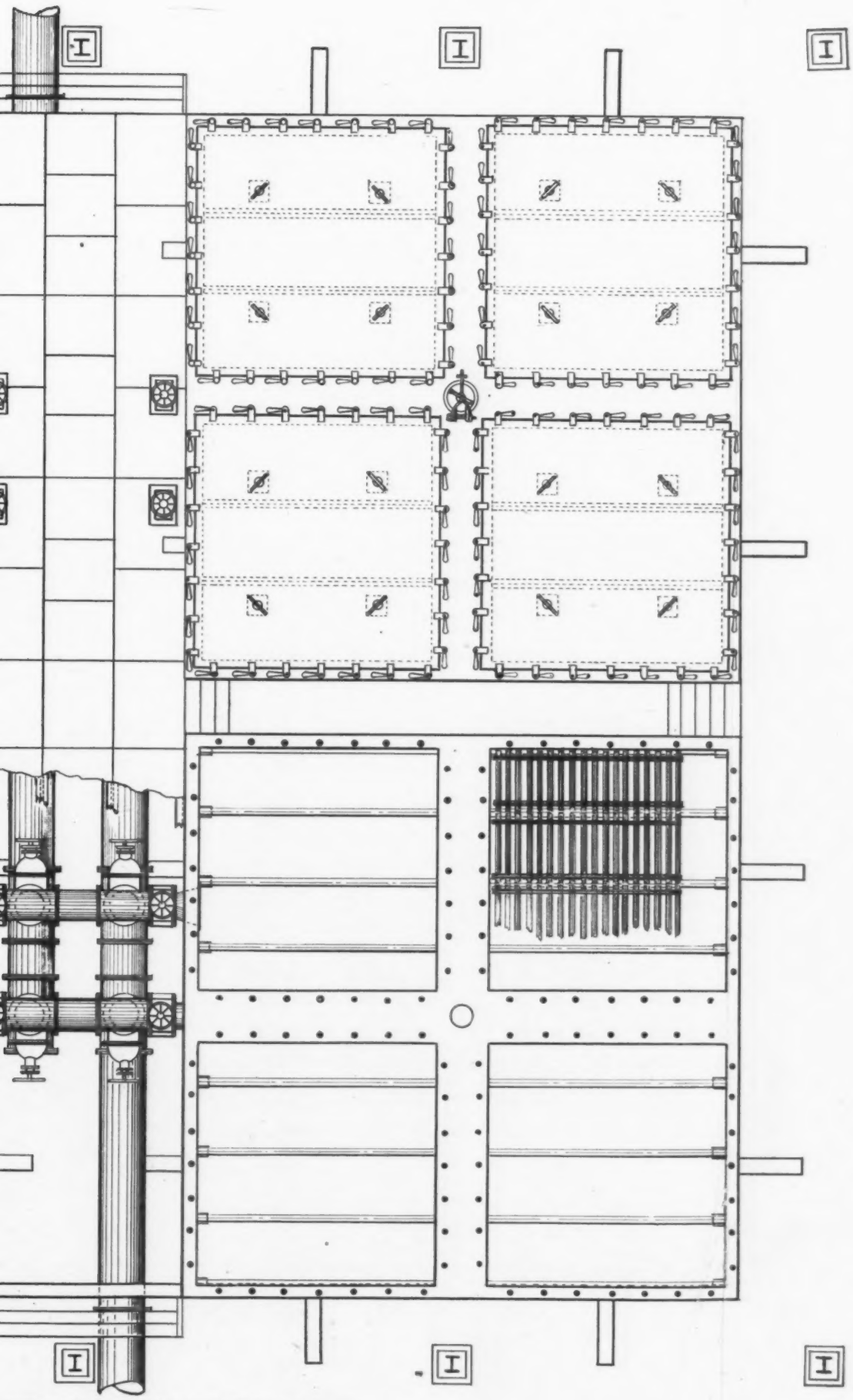
No. 23 —Elevation of Four Cement Purifiers, 25 feet by 25 feet by



eet by 7 feet with Dry Lute Covers



No. 24.—Plan of Four Cement Purifie



Purifiers, 25 feet by 25 feet by 7 feet with Dry Lute Covers.

lift, no cover carriage, only self-sealing doors to handle, cheapness and quickness of emptying, no trays to wear out or clog up, flow of gas into oxide not obstructed by trays or woodwork, minimum of back pressure, slowest flow of gas where oxide is most disposed to cake, no line of least resistance permitting foul gas to short circuit through the oxide; and last, but not least, a great saving in first cost." Installations have been put in, in Louisville, Ky. (Kentucky Heating Co.); Madison, Wis.; St. Joseph, Mo.; Austin, Tex.; DeKalb, Ills.; and Coshocton, O.; the largest box being about 30 feet by 13 feet by 13 feet, the smallest about 10 feet by 10 feet by 10 feet. They are said to be giving good satisfaction.

A distinct form of box brought out in the past few years is the Chollar, designed by Mr. B. E. Chollar, Engineer of the Laclede Gas Light Company, St. Louis, and built by the Stacey Manufacturing Company, of Cincinnati, O. This, illustrated in Fig. No. 13, is constructed usually in cylindrical wrought iron vessels in pairs, connected by such four-way and bye-pass valves as to enable passing the gas through the oxide beds in any order desired, and especially at certain intervals in a reverse direction. Dry lids and clay lutes are used, and great compactness is secured. As no paper upon this form of box has appeared before any of the Associations, it may be proper, from the standpoint of convenient reference to the claims for it, to herewith quote from Mr. Chollar, himself, as to the process involved, and the extent of its adoption: "My principal purifying patent is a process patent, and does not necessarily require special apparatus. The operation is as follows: When unpurified gas mingled with air enters a bed of clean oxide the sulphureted hydrogen, being at its maximum in proportion to the air, attacks the oxide, overpowering the oxidizing action of the air. As the flow of the gas proceeds through the bed, the proportion of sulphureted hydrogen becomes gradually smaller and smaller, while that of the air remains practically constant, until at length the proportion of sulphureted hydrogen becomes small enough so that the air can revive the oxide as fast as it becomes fouled by the gas, but in the mean time the fouled condition of the oxide has been creeping gradually upward, so that by the time the fouled condition of the oxide has reached the middle of the bed or thereabouts, the gas might show a slight stain at the top of the bed. If at this time the direction of the flow has reversed and be made to flow from the top downward, the same action will take place at the top as took place before at the botton of the bed—and by the time that the fouled condition of the oxide has reached a place somewhere about the middle of the bed as before, the sulphureted hydrogen will have been removed, leaving the full quantity of air remaining in the gas free to revive the fouled oxide below. What is true of beds is true of boxes—when a box becomes fouled, it is placed last in the services, so that the clean gas from the box ahead of it can revive it up and get it ready to be made the first box again. There are in use at present about 17 sets of this kind of apparatus, the smallest being 5 feet in diameter and the largest 32 feet—this latter set is in St. Louis, and was put into service about June 1, 1901; up to the middle of April last it has passed more than 415,000,000. The only change made during that time was to reverse the order of the boxes once. The first set installed is in Carondelet, Mo.; the boxes are 10 feet in diameter—the longest run was 33,000,000.

A form of box brought out in the past year or so, and sufficiently extreme in one feature to call for notice, is the "deep duplex" setting of the Western Gas Construction Company. This is primarily of ordinary purifier type and construction, but of the Beal form, having the gas enter the center, dividing in two streams as above described. Its feature, however, is the very great depth of 11½ feet, probably the deepest construction yet tried, and enabling the carrying of oxide beds of 5 feet in thickness each. Several of these boxes of 20 feet by 20 feet by 11 feet 6 inches each have been built, and the capacity of a recent 20 feet by 24 feet by 11 feet 6 inches size is given as 1,500,000 per day, per pair.

Without changing principles or general practice, a marked improvement in purifier construction has in recent years rapidly grown in favor in England, and somewhat strangely has not yet been taken up in the United States. I refer to the Green type of lid for ordinary boxes, wherein a dry cover joint is used instead of a water seal. We know the inconvenience and expense of water cups, blowing, leaking or freezing seals, rusted sides and heavy covers to lift. Mr. Henry Green, Engineer of the Preston (England) works, first built boxes without water seals. Instead he used a rubber gasket, tightened by bolts. Moreover, he ran gangways across the boxes, subdividing the top area, using 4 small, flat lids, about 10 to 12 feet square, instead of 1 deep, heavy cover, thus dispensing with much lifting apparatus. The boxes, moreover, being without seals, he put side to side, and from wall to wall, without aisles (working operations being conducted on their tops, which become virtually a floor with 12-foot hatchways), and in this way he considerably increased the capacity for a given size building. The system has been worked out and well perfected, has been adopted in 100 or so works in England, and much of the new work there is on its lines, and is so superior to the old practice that one United States gas engineer, for some years resident in England, states that he wonders why any more boxes should hereafter be built with water seals. Figs. Nos. 14 and 15 illustrate a dry lute purifier plant with the lids down (showing the flat floor formed) and open for filling, respectively. In Sheffield a plant of this sort of 3 boxes, 74 by 40 feet each, is so built as to be substantially one continuous partitioned box, 210 feet long by 40 feet wide, each section having its own valves. The only practical objection to the dry lute was the time required to adjust the nuts to tighten down the lids. This has been largely overcome by several cam devices bearing down along the edges of the lid, operated by a lever from one point. To those of you contemplating new purifiers, the system is well worth investigating, especially as a saving of one-fifth or so in metal and cost may also be found. Mr. Green's paper, "The Construction of and Mode of Working Purifiers," may be found in the London *Gas World*, June 25th, 1898. Another paper on the subject is by Mr. G. P. Lewis, "Notes on Purifier Construction," Nov. 17, 1900. Good descriptions of the system may also be found in two recent little books—Mr. Fletcher W. Stevenson's "Modern Appliances in Gas Manufacture," 1901; and Mr. C. E. Brackenbury's "Modern Methods of Saving Labor in Gas Works." Excellent descriptions of a typical dry-lute purifier plant, of 6 boxes each, 30 feet by 30 feet by 5 feet 9 inches, just constructed at Leigh, England, may be found in the *Journal of Gas Lighting*, April 15, 1902, and in the London *Gas World*, April 12, 1902, p. 616.

Proposed Forms not as yet Adopted.—Any review of purifiers' practice would be short, if it did not pay some attention to the suggested improvements, from time to time made in good faith by gas men in good standing. The patent office is full of alleged improvements, most of which will never emerge from musty oblivion. But few seem to be worthy of mention.

James T. Goodfellow and Frederick A. Sabbaton, of Troy, N. Y., June 17th, 1873, patent 140,034, conceived a continuous treadmill arrangement shown in Fig. No. 16, wherein a continuous stream of gas was fed against a continuous stream of oxide, handled on an endless chain treadmill arrangement. I have no knowledge of the results of trial apparatus or any success obtained.

August Kloenne, of Prussia, August 17th, 1880, patent 231,177, planned a vertical arrangement (shown in Fig. No. 17) of inclined trays in a tower purifier up through which the gas would flow and down through which a continuous zig-zag column of oxide would slowly work, being removed at the base by a water sealed worm screw. I have no knowledge of trial or results.

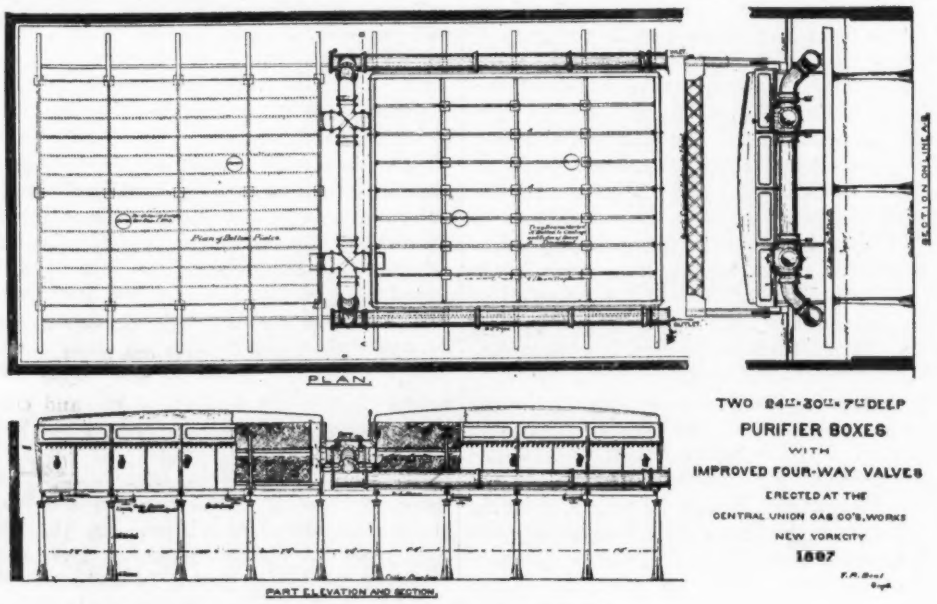
Henry C. Rew, of Chicago, December 25th, 1883, patent 290,928, planned a vertical lime purifier with tilting or dumping trays, as shown in Fig. No. 18.

Wallace C. Andrews, then President of the Standard Gas Company, of New York, April 22d, 1890, patent 426,092, planned also a box with dumping trays, as per Fig. No. 19. His especial idea was a shower of lime through which the gas would pass, and he built a tall, scrubber-like vessel, 40 feet high, in the Standard Works, New York, to try the plan, which, owing to clogging and other reasons, in practice entirely failed.

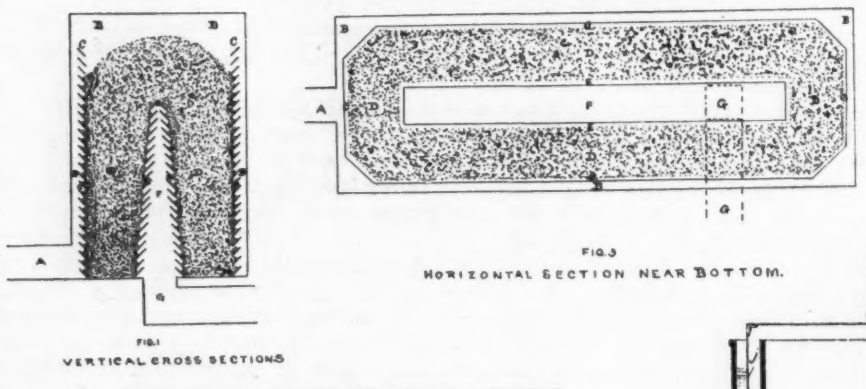
In 1897, I conceived the idea of a 4-deck or quadruplex purifying box, with dumping trays (Fig. No. 20), to save ground space, construction cost, etc., presenting the proposed plan in a paper entitled "A Quadruplex Purifying Box: Why Not?" at the American Gas Light Association meeting of 1897 (AMERICAN GAS LIGHT JOURNAL, November 8th, 1897). The paper is of interest in connection with purifying vessels, in showing how one line of thought or plan can be elaborated or carried out, but further thought has made me feel that the plan therein proposed was too complex. As a matter of fact such a box has not been tried, and I frankly feel that while possibly ingenious it is not the perfect box.

Mr. Henry G. Beatley, of Marquette, Mich., in 1898, at the March meeting of the Michigan Gas Association, in a paper entitled "A Closed Purifying Vessel" (AMERICAN GAS LIGHT JOURNAL, March 14th, 1898), proposed a hopper arrangement of continuous oxide feed, against a stream of inflowing gas, carried out in an ingenious manner (Fig. No. 21). I do not understand, however, that any working apparatus has been constructed.

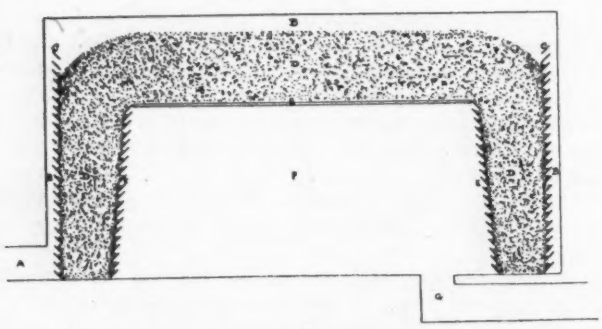
A Cheap Construction for the Standard Form of Purifier.—Coming down now from the history of the past, the variations of the present and sundry propositions for improving the future, after all is said and done, it is without doubt true that the rectangular box (connected as

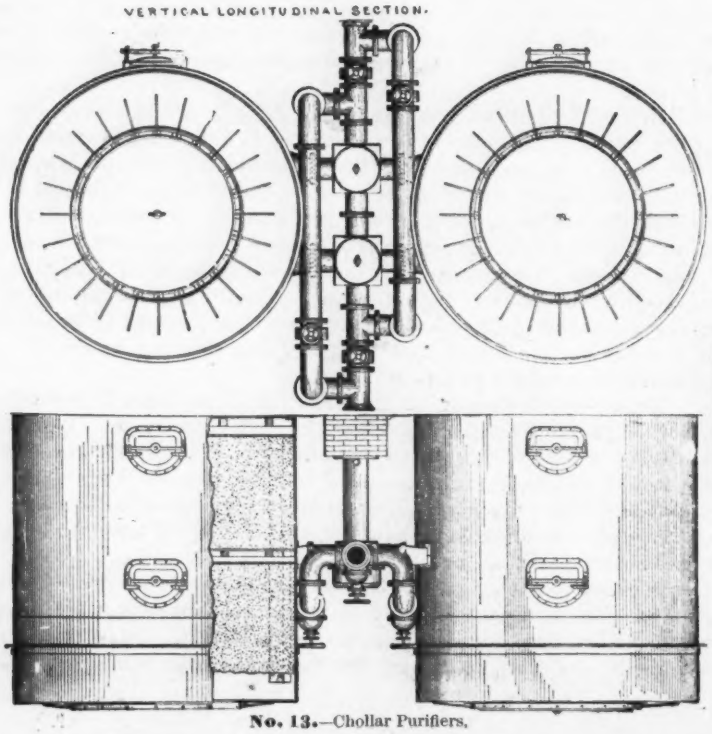


No. 11.—Two Purifiers of Beal Form.



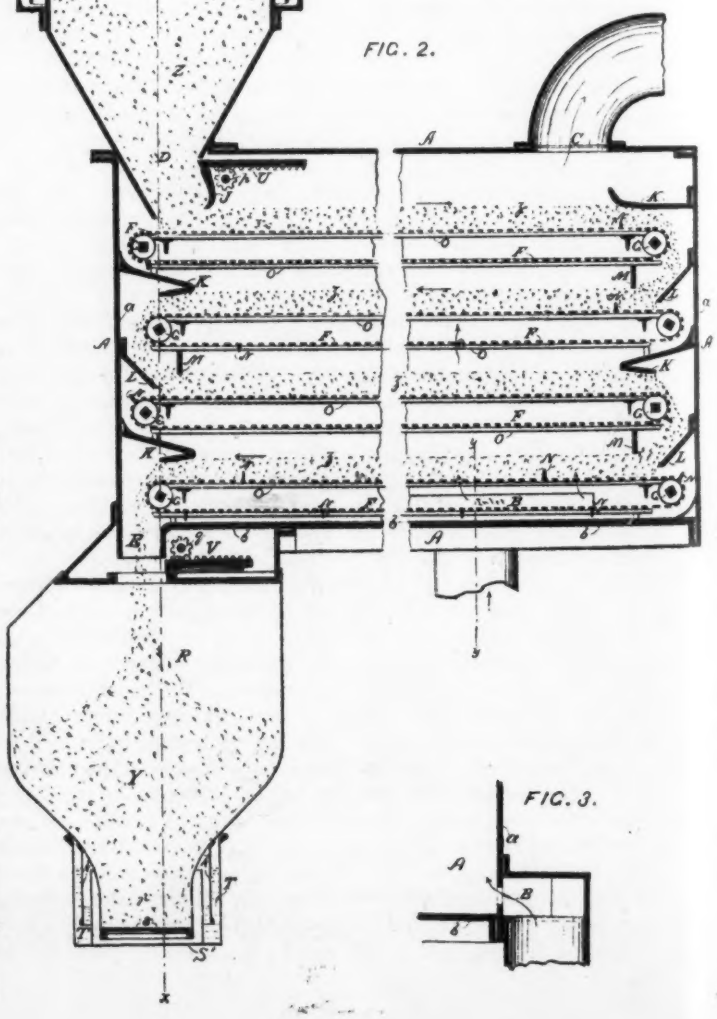
No. 12.—Cross Sections and Plan of Doherty-Butterworth Purifier.

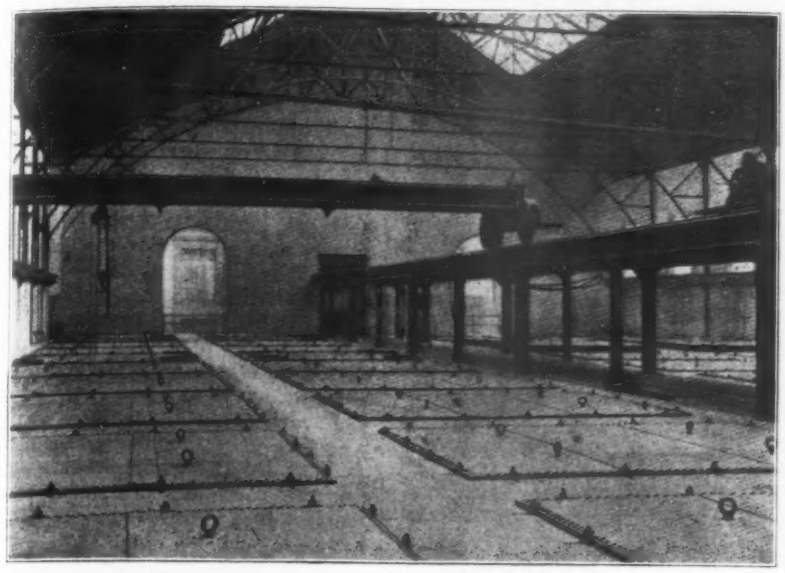




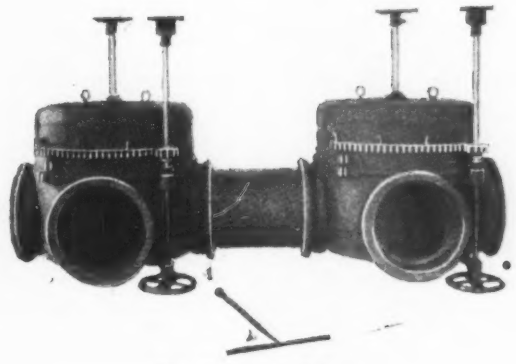
No. 13.—Chollar Purifiers.

No. 16—Goodfellow and Sabbaton's Proposed Purifier.

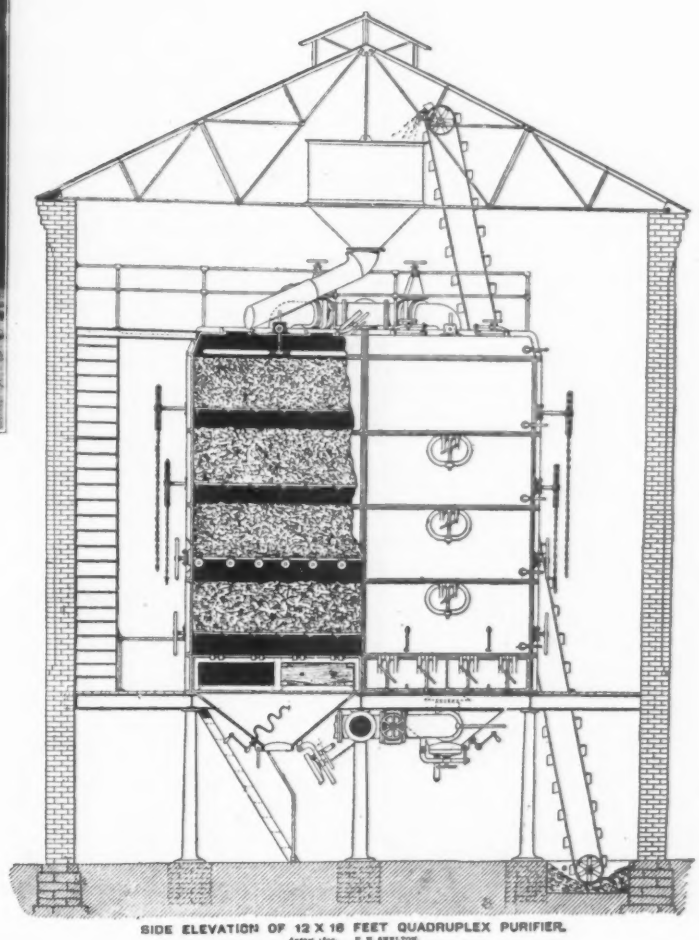




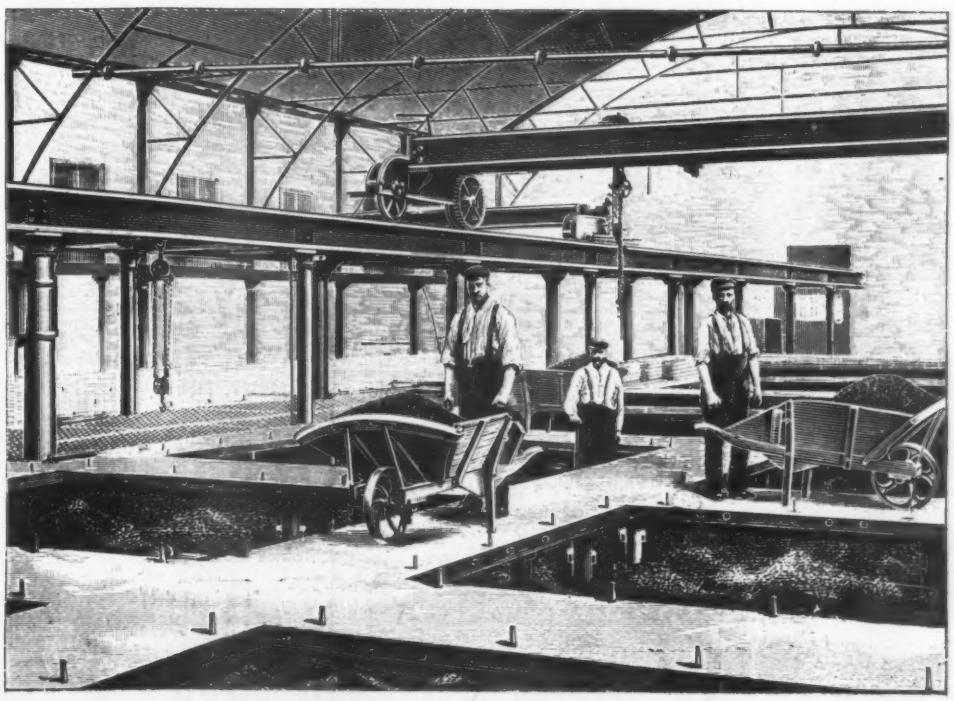
No. 14.—Dry Lute Purifiers, with Lids Closed.



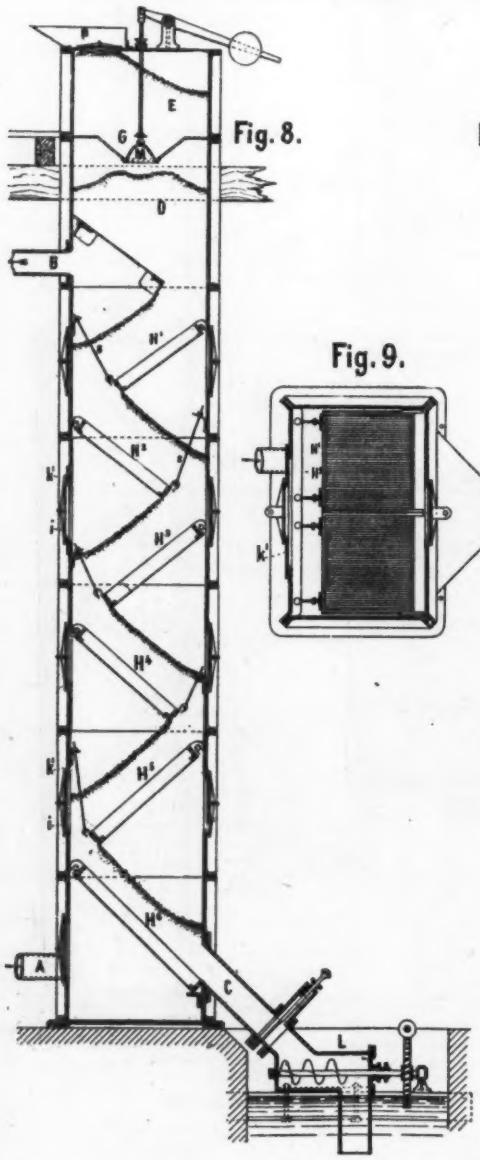
Four-Way Center Valves.

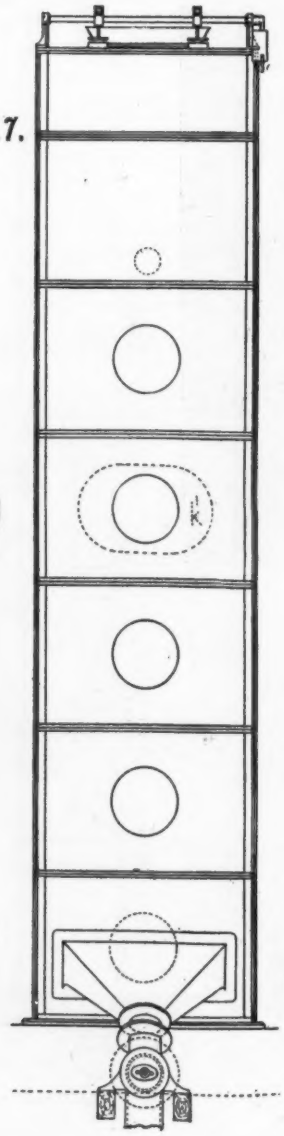


No. 20.—Shelton's Proposed Quadruplex Purifier.

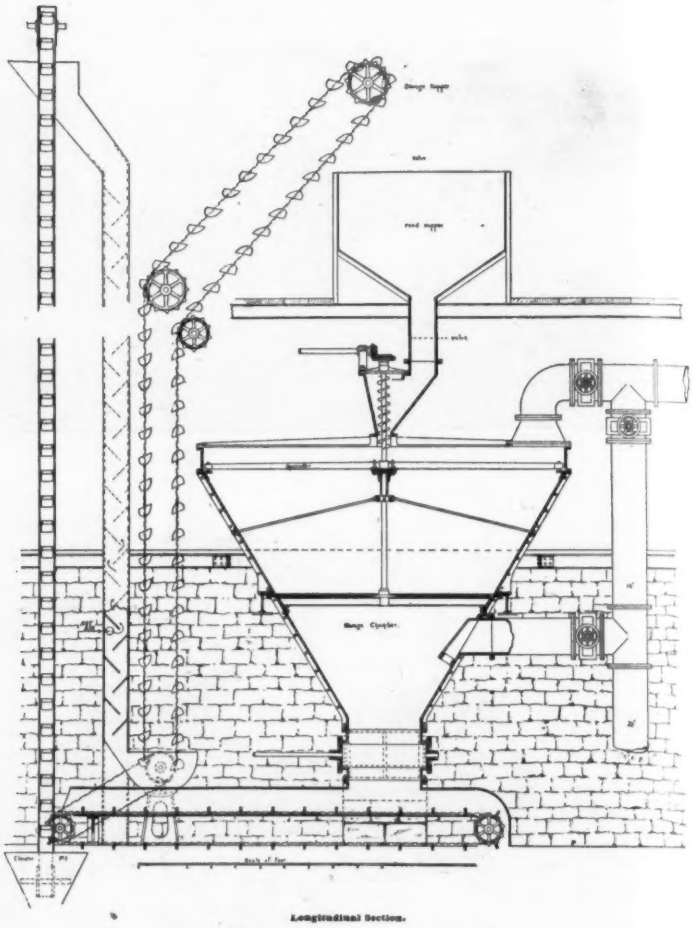


No. 15.—Dry Lute Purifiers, with Lids Open.



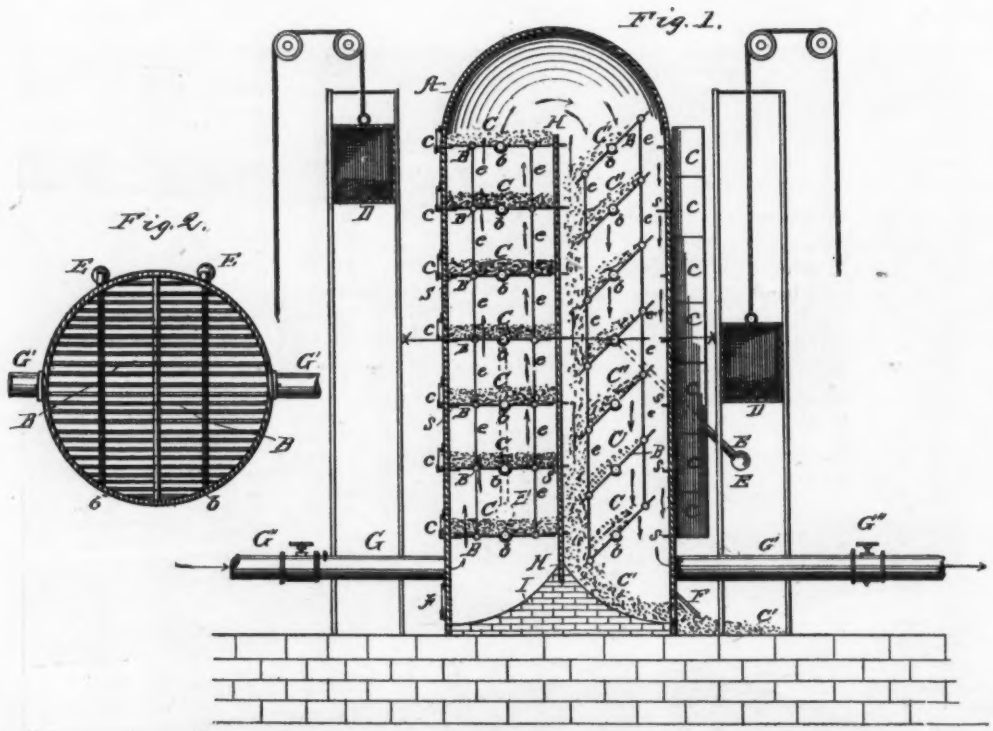


No. 17.—Kloenne's Proposed Purifier

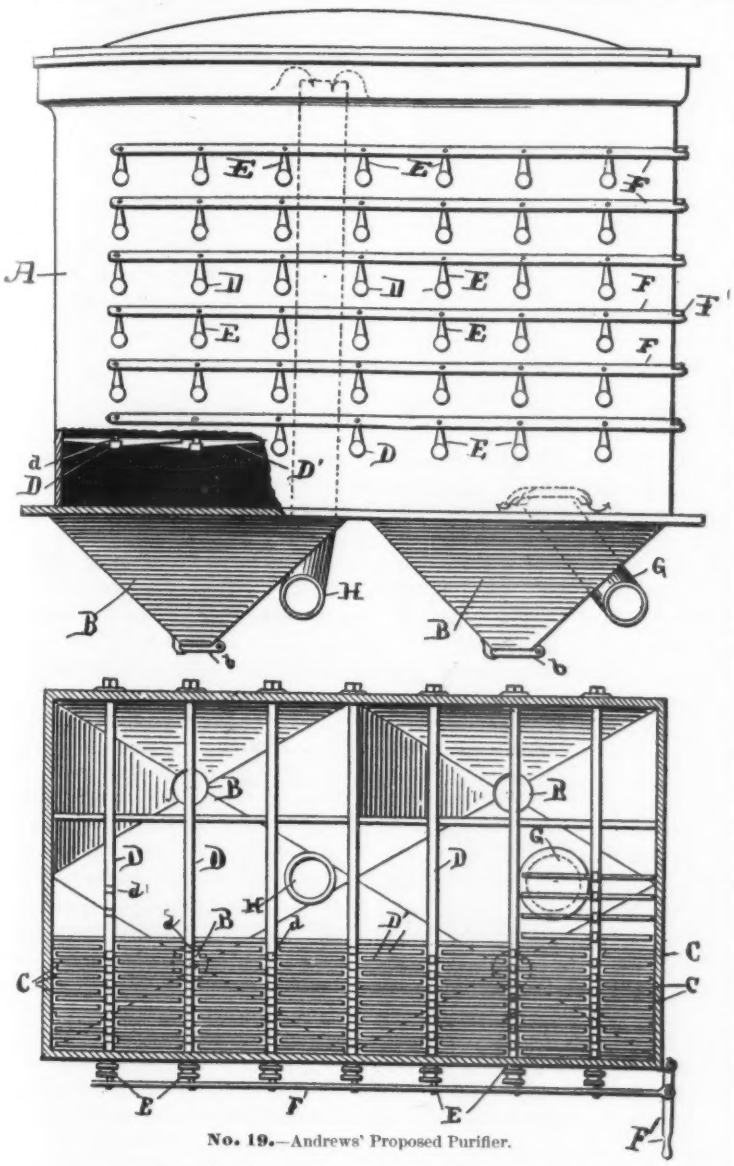


Longitudinal Section.

No. 21.—Beatley's Proposed Purifier.



No 18.—Rew's Proposed Purifier.



No. 19.—Andrews' Proposed Purifier.

one may prefer), is the standard, prevailing type. Any method of building this, whereby usual expense is cut in half, can but be of interest. I will end by briefly describing 4 boxes, 25 feet square by 7 feet deep, of the Beal two oxide tier, divided stream form, with Green type, dry lute, gasket lids, that I am now preparing to build for the New Orleans Lighting Company. The boxes are 4 in number, set in a square, half below the ground level, half above as shown in Figs. Nos. 22, 23 and 24. The chief feature of novelty is that they are made of cement bottom and sides, 6 inches thick, instead of the usual cast iron, machined plates. This cement is run in between proper mould boards, and between these boards and imbedded in the bottom are sheets of "expanded metal" or sheet steel web work that bond all together. Light pilasters are provided outside, although it is expected that without them the walls would be entirely self contained. The co-efficient of expansion and contraction is the same for cement and iron, and the result is that in this class of work such bonded cement walls contract or expand without cracking. The adhesion of the cement to the bonding sheets is also greater than to itself. The top edges of the sides of the boxes are capped with a 6-inch channel iron, inverted, to take wear and tear, etc., and to form a flat surface for the gaskets; 1-inch bolts project every 20 inches, to which are fastened swivel dogs or cams with taper under sides. The top of the box is spanned by a sheet iron walk way, on iron beams, bisecting the 25-foot box each way into 4 squares. The lids to cover these 4 square openings are about 11 feet square each, simply ¼-inch iron, with angle iron run around the edges, and a couple of tee irons across to stiffen. It is obvious that a very light lifting load results, compared with the usual 26-foot deep trussed cover. When the lids are lowered in place the cams are turned partly into place by hand. The workman then walks around the box with a mallet knocking each one further into place, and the resulting wedge action on the edge of the list compresses the rubber and makes a gas tight joint. This rubber gasket may be ½ inch by 1½ inch section, or half-oval, like a carriage tire; either form works well. It is prevented from adhering to the box by a little graphite rubbed on, and it is cemented to the under edge of the lid so that when the latter is lifted it carries the gasket with it, away from shovels, bootheels, etc. The gas is carried by the inlet pipe into the center of the box to a standpipe from which it emerges top and bottom, and this standpipe makes an excellent center post in the box and support for the cover framing and walk-ways, it being remembered that the fixed cover with movable 11-foot hatchway lids is to a large extent the working floor. The standpipe also affords excellent support to the oxide tray bearing bars, which are of usual arrangement, the outer ends being carried by lugs bolted to the cement sides. A 24-inch main serves the set of boxes; a 12-inch feed supplies each box, and this stream in turn is divided, each half having a bed of oxide about 2½ feet deep by 25 feet square for purifying. One, 2, 3 or 4 boxes can be used, the order can be reversed, or any one cut out; sixteen 12 and 16-inch valves control the whole; being of small size they are unlikely to get out of order. I figure the capacity of the set as from 3½ to 4 million feet per 24 hours. The construction is easy on foundations, the load per square foot being very light. The boxes rest on the earth; all under beams, columns, and connections are avoided. The pipe connections necessary are very brief and simple.

A set of ordinary boxes 25 feet by 25 feet by 7 feet erected in New Orleans would cost from 20 to $25,000. The usual two-story brick building and other work would raise the expense to $35,000. These boxes are housed in a one-story pavilion structure, 60 feet by 70 feet, and the total cost of it and the cement construction and other work will be probably a little less than half of $35,000.

It is obvious that the oxide cannot be shoveled through the bottom of these boxes. It will be removed by shoveling into large iron dumping buckets hanging (by light chain block, if necessary) to a little trolley on an overhead rail, forming a continuous track over and from the boxes to the adjoining oxide shed and return. These tip buckets, as filled, are pushed by hand to the shed and dumped, an empty one, meanwhile, coming in on the return rail to the men in the box shoveling. This system is very simple, cheap and effective, involves practically no repair account, and no hoisting of the oxide to a second story, and is that that was lately put into the recent new model works at Zurich, Switzerland, and is in use in many of the German works.

The use of cement as above is merely a definite practical application to gas purifier purposes of a class of construction well established. The Monier system abroad (wire rods imbedded in and bonding cement) and the extending use of expanded metal and cement construction here, practically eliminate the question of experiment. And one can, moreover, go back to old purifiers, half depth in the ground, built with brick walls like a brick holder tank, as shown in Clegg's books on gas 50 years ago, and find closely allied construction. But the particular working out of the boxes as at New Orleans, in connection with the Green dry lute lids, is as a whole unusual, and I trust that my account of them has been of interest to you.

Discussion.

The President—Mr. Shelton's excellent paper is before you for discussion. Mr. Chollar, have you anything to say about it?

Mr. Chollar—My patents altogether are 6 in number. The principal one is for a process, not for an apparatus. The purifiers so far constructed under the patent have been circular in form. The round shape was adopted to provide for extreme depth and large diameter. The operation of the system is unique, and is clearly described in Mr. Shelton's paper. Theoretically the boxes would not need to be cleaned out until the accumulation of sulphur would cause them to burst; but in practice such is not the case, they will not run indefinitely. Mr. Shelton spoke of a dry sealed cover instead of a hydraulic cup. I use a similar one. The cover is held down by small wedges, the joint being made by common clay luting, such as is used on retort lids. The quantity of air required is the same as that used by ordinary purifiers using oxide. The large set in St. Louis has boxes 32 feet in diameter. The trade mark is, "The Purified Gas Revives the Fouled Oxide."

The President - Has anyone present had any experience in cement construction like that referred to by Mr. Shelton?

Mr. H. H. Hyde—I would state that, when we built our new works at Racine, Wis., we constructed two wells having 500 barrels capacity each. These have concrete bottoms, walls of concrete, in which is laid expanded metal, and concrete tops supported by I-beams. After the bottoms were thoroughly set, inner and outer circular framework, similar to sheet piling, was erected to the desired height, and into the space between the two was rammed concrete, in the center of which was suspended strips of heavy expanded metal. When sufficiently set, the circular framework was removed and steel I-beams laid over the top of the walls, and over

and around these beams concrete was laid and smoothed off. These wells were built two years ago, and up to the present time there has been no cracking whatever. The construction seems to be perfectly satisfactory.

Mr. Egner—Such a valuable paper as that by Mr. Shelton should not be passed by without a thorough discussion, so I will say a few words, as previously remarked, just "to keep the ball a rolling." About five years ago I saw this method, as shown in the illustration on page 90, at the gas works in Belfast, Ireland. Mr. Stelfox, the Engineer of the corporation, had the same opinion of center valves as expressed by Mr. Shelton. I wondered if this was not an illustration. It looks remarkably familiar to me. What I want more especially to call attention to is this water seal of that very installation.

Mr. Humiston—The combined use of steel and concrete is quite common. A very good example of such construction is the Melan, steel concrete, arched bridge, in which concrete takes the compression, and steel beams imbedded therein reinforce the structure against transverse stresses. Faults in such structures, developed by variation in temperature, have been rare. The results of exhaustive experiments, to determine the co-efficient of expansion of concrete, were placed before the Western Society of Engineers, last December, in a paper by W. D. Pence, Professor of Civil Engineering in Purdue University. The value is .0000055. This can be conveniently remembered as 5 zeros, 55. The co-efficient of expansion of Bessemer steel is .0000065; about 15 per cent. greater than that of concrete. Mr. Ernest L. Ransome, of San Francisco, has received a British patent covering a method of increasing the tensile strength of iron bars by twisting. It was designed to use these twisted bars imbedded in concrete in the construction of complete monolithic concrete buildings, dams, reservoirs or other such structures. One of the largest buildings of the Leland Stanford, Jr., University was built in this manner, and I believe it has been an entire success. Of course, this might not be the case in our Eastern States, where the mean annual variation in temperature is greater than it is in California.

Mr. Norris—The modern tendency of purification is toward higher temperatures, and I wonder what the effect of 100° of temperature would be on this box made of concrete, and whether the difference in temperature between 100° inside and the ordinary temperature on the outside would have a tendency to produce a crack, starting from the outside.

The President—What do you think of these oil tanks in Texas, with the sun shining on them?

Mr. Norris—Of course, we all know that water tanks made of masonry are tight, but I just mentioned this temperature question because it occurred to me.

Mr. Doty—There is no mechanical action in the boxes?

The President—None.

Mr. Shelton—The practical idea is that of suggesting a box which anyone can make with very little money, and simply and easily. There are a great many small companies that do not have purifier capacity enough, and have not the money to get the usual machined plates and expensive shop work. A purifier, after all, is nothing but a filter box, a rectangular vessel to hold lime or oxide, Now, what is easier to make? I do not mean to say for every case or where room is restricted, or where every foot of space counts; but in ordinary cases what is simpler than going into the yard and digging a hole 10 or 20 feet square, putting in a bed of cement across the bottom, putting up planks 6 inches apart along the sides with sheets of expanded metal between, pouring in cement, pulling the planks away and you have your box. To cover it exercise a little horse sense. Provide a simple lid, make a joint in one way or another with a gasket and nuts or bolts, cams or screws. Run an inlet pipe into this cement box; run it out and you have a practical box, costing less than 40 per cent. of the usual. You need not have cracks, but if you do, plaster or caulk them. It is not a serious matter to remedy a crack in a small vessel of that kind. The only argument against the box is that you cannot run the oxide through the bottom, you must take it out through the side. It is practical to do that. Use a couple of swinging buckets on an overhead rail. Some of the best gas companies on earth take the oxide sidewise, and have no trouble at all. With a 2-story building you have columns settling, beams across, and an expensive structure with heavy foundations. You may put a concrete box in your yard almost without foundations. Removing oxide is simple. With tip buckets it is easy to swing the bucket to any part of the box and shovel into it as readily as through a hole to a floor below. You give the bucket a push and it runs to the oxide shed; after dumping, another push returns it, while meantime the other bucket is being filled. The system involves no repairs, almost no great expense of installation, and can be operated at a low cost for taking the oxide out sidewise instead of on the top. I commend to you this purifier of simple construction that costs but little money.

Mr. Doty—Mr. Shelton is nothing if not original, and he has earned and deserved the thanks of the Association, in the first place for his presentation of this most excellent paper on a pressing question. Whatever he undertakes to do he does thoroughly. In addition, he has presented a novel idea. There is no doubt that Mr. Shelton has the courage of his convictions, and that his expression thereof is always in the right direction.

On motion of Mr. Doty, a vote of thanks was passed to Mr. Shelton for his paper.

[To be Continued.]

The Use of Superheated Steam.

By Mr. W. H. Wakeman, in *Electricity*.

As the temperature of superheated steam is greater than saturated steam at the same pressure it becomes necessary to provide means for adding heat to it after it has been generated in the ordinary way. We are told this cannot be done so long as it is in contact with the water from which it came, but that a separate vessel must be provided. This is true, when steam that is not in motion is concerned, because when heat is applied under these conditions it is conducted to the water and absorbed by it, resulting in the evaporation of more water and an increase in the pressure, thus preventing an excess of temperature above what corresponds to the pressure.

When steam is traveling rapidly from its source to an engine the conditions are changed, and although it is still in contact with the water from which it was generated, it can be superheated without passing it into a separate vessel, and maintaining another fire for this purpose. With the ordinary tubular boiler, set so as to prevent heat from reaching the shell above the water line, it is not possible to do this, but a superheater must be employed. A case of this kind has recently been brought to my notice where saturated steam at 90 pounds pressure with a temperature 331° is raised to 400° for use in heating an oven where a very high temperature is desired.

The economy which results from the use of superheated steam is partly due to the fact that the specific heat of steam is much less than unity, and the way this operates in the case just mentioned is as follows: If we were carrying steam at 22 pounds pressure its temperature would be 262°, and if we wished to raise its temperature 69° without superheating it becomes necessary to increase the pressure to 90 pounds, making the temperature 331°. This means that for every pound in weight 69 heat units have been added to it from the coal pile. Now if we wish to increase the temperature 69° more we can do it by superheating, but we shall not have to add 69 heat units as before. The specific heat is .475, therefore we shall have to add only 69 × .475 = 32.775 heat units, or less than one-half of the former quantity. So far as heating is concerned, superheated steam is not a success, because it does not condense as readily as saturated steam, but this quality makes it valuable for use in an engine, not only because it reduces initial condensation, but a higher pressure is secured after cut-off takes place, thus giving more power from an equal quantity by measure of steam.

Judging by the way in which the value of superheated steam has been presented to the public during the past year, and the description of apparatus for producing it, we might conclude that it is a new discovery, but this is not correct because its virtues have been known ever since the steam engine was made a practical success. When engines were first put into service, the pressures used were very low, so that superheated steam was a great improvement, but the apparatus necessary to produce it was cumbersome and expensive, therefore attention was turned towards the benefits accruing from higher pressures, and means were found to produce boilers that would safely carry these pressures, resulting in the use of a more compact and economical plant than is possible with low pressures and superheaters.

When saturated steam is mentioned it means steam that contains all the water it will hold in suspension, or in other words, it is dry steam, although the two terms seem to mean different things.

The average boiler furnishes steam mixed with drops of water, so that when a superheater is provided it has to supply heat enough to evaporate these drops before it can begin the work of superheating in the correct sense of the word. Let us note the comparative amount of heat required for this purpose. To raise the pressure and corresponding temperatures from 22 to 90 pounds requires 69 heat units for each pound in weight. To raise the same weight from 331° to 400° requires 32.775 heat units, while it takes 883 heat units to evaporate 1 pound of these drops of water

into a steam at 90 pounds pressure. This partially explains the great gain secured by use of a superheater in cases where the steam is not dry, especially if the heat used is a waste product. It also provides a reason for the durability of superheaters under these conditions, as they are both evaporators and heaters combined.

The great advantages to be secured from the use of superheated steam are frequently presented, but the small disadvantages that are inseparable from the system, which call for precautions not otherwise necessary, are not so much in evidence until it is given a trial in everyday service, and then it is too late to avoid expensive delay and annoyance. A water tube, or a vertical boiler, may be designed so that steam in some of the tubes or steam space is heated by the hot gases just before they go to the stack, resulting in superheated steam.

If the pressure is high in such a case, and by this is meant anything above 75 pounds, do not depend on soft packing to keep flange unions packed, as it will not do it. The great heat will melt a portion of the packing, allowing pressure to blow out the remainder. Some of these flanges are left so rough when made that nothing but a soft packing will make them tight, therefore such flanges should not be used on a plant that is to generate superheated steam. Asbestos mill board will last in such a place, but it is not pliable, hence will not fill the rough spots like softer material does, therefore only machined flanges and asbestos mill board should be used, unless copper gaskets are preferred. Ground joints are not considered practical.

Only the best kind of metallic packing should be put in the piston rod stuffing box of an engine that is to use superheated steam, especially if said engine is to run generators that are required for many hours without interruption, or any other kind of machinery that is operated day and night.

I once wrote to a manufacturer of fibrous packing, stating that the piston rod of a certain engine required packing frequently, and asking if his product would stand superheated steam for a reasonable time. His reply was that it would not, although he spent much money for advertising his goods and wished to sell as much of them as possible. I believe that in a large majority of cases, even where saturated steam is used, it pays to adopt a metallic piston rod packing, but it is practically a necessity with superheated steam, and should be so considered when the plant is erected.

The same principle applies to sliding and rotating valve stems on steam engines, as fibrous packing will melt away and disappear in a short time when applied to such stems. When the steam blowing out around a valve stem is under such high pressure that it can be felt a yard distant, but so hot that it cannot be seen, it is not reasonable to expect fibrous packing to stand before it.

A cylinder oil that does fair service on an engine operated by saturated steam at a low pressure, but has no surplus along this line, will be much worse than useless when used in connection with superheated steam, as the heat burns it, therefore the valves and piston are not lubricated and wear excessively. First-class cylinder oil is nearly always a profitable investment, but with superheated steam it is an absolute necessity.

Thousands of globe valves with hard rubber disks are used at the present time, because they can be repaired so easily when they leak, but it is useless to put them on to hold superheated steam, as they will not do it. The best that are made will not stand this severe test, hence it is only a waste of time and money to attempt it.

The stems of globe, gate and angle valves that are destined to control this steam should be packed with asbestos wicking, coated with graphite mixed with cylinder oil, as nothing is superior to this combination for withstanding heat.

The washers or gaskets used to pack the glass gauge, will not be effected by the extra heat as one of them is below the water line, and the other is not far enough above it to get the full benefit, or the full damage of it, for steam just above the water line cannot be superheated. Steam that is superheated, or even when it is perfectly dry without the superheat, will not burn the hand when blown onto it, like moist steam does, because it must give up its heat readily before it can burn the flesh, and as steam containing extra heat does not do this it is less dangerous than steam or water mixed.

The above mentioned points to be considered are not given as objections to superheated steam, but on the contrary are presented for the purpose of preparing those who intend to use it for what they may expect. When the matter is understood and preparations made accordingly there is much less chance for disappointment and rejection of the system than when a plant is shut down several times in order to remedy evils that might easily have been provided for, if their consequences had been foreseen from the beginning.

United States Coaling Station at Manila.

One of the most potent factors in the government policy of holding the Philipinne Islands was the advantageous position of Manila Harbor as a coaling station for war vessels in the Eastern waters. The naval engineers decided than Sangley Point would be the best location for large coal pockets and coal handling machinery.

Extensive wharves and fireproof buildings are being erected for this purpose. Two coal sheds are each 194 feet wide and 300 feet long, with an interval of 50 feet between them, while the wharf is 418 feet in length and 75 feet in width.

The coal handling machinery was designed to remove the coal from colliers by means of hoisting towers and distribute it in the storage sheds by automatic railways; also, to coal the war vessels at the wharf from the shed. To do this to best advantage, required two steeple towers, equipped with steam hoisting engines and duplex steam shovels, 12 automatic railways and over a mile of track. All this coal handling machinery, together with accessories, such as railway equipment, cars, coal tubs, etc., is being built by the C. W. Hunt Company, New York.

Recently 36 flat top, 4-wheel cars were completed and shipped to the Philippine Islands. Each car is of 1-ton capacity, to be used on the Hunt Industrial Railway. Standard gauge for this railway is 21½ inches, out to out of rail heads, and is admirably adapted for transporting material on wharves, warehouses, docks and shops.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE plant of the Suburban (Pa.) Gas Company, of Darby, has been dismantled. This was done in furtherance of the Company's plans to supply gas to the district from the main works at Chester, Pa.

THE Electric Carbon Gas Company, to operate in Pierre, So. Dak., has been incorporated by Messrs. Wm. D. Hersey, John W. Hersey and Jas. S. Sebree.

A CORRESPONDENT in Marshall, Mich., writing under date of the 1st inst., says: "Mr. Arthur G. Fox, Superintendent of the Marshall Gas Company, will retire from that position on July 1st, after a continuous service of 21 years. He will be succeeded by Mr. George E. Harris, well known to the gas men of Michigan and Western New York and the provinces of Canada as traveling representative of Messrs. George M. Clark and Company, of Chicago, with which concern he has been identified for nearly 10 years. Mr. Fox's future address will be Fort Myers, Fla., near which place he has a plantation located on the Caloosahatchee river, to where he will move his family about the last of August, and, seated under a spreading palm tree, he will endeavor to forget the troubles of a gas man. Mr. Fox is now having built a 22-foot naphtha launch—the 'Wolverine'—in which he expects to spend many pleasant hours cruising up and down the river, enjoying the beautiful tropical scenery. And we shall later on expect to see his name enrolled as a successful catcher of tarpon, the catching of which, the weight of the fish, and the name of the successful angler are printed in the Fort Myers papers. Any of the gas fraternity who may chance that way will always find the latchstring out. His many friends wish him years of happiness and prosperity in his new home."

MR. AUSTIN BURT, Manager of the Cedar Falls (Ia.) Electric Light Company, has been petitioned by the residents to establish a gas plant in that thriving place. He replied that if 300 residents would agree to use gas he would forthwith construct a works. He also agreed that the selling rate should be $1.50 per 1,000 gross, with 15 cents off for prompt payment.

THE Mechanicsville Electric Light and Gas Company, to operate in Mechanicsville, Round Lake and Stillwater, N.Y., has been incorporated by E. and M. J. Farrow and Jas. A. Greenway.

MR. SAMUEL SKINNER (according to the following story forwarded by a correspondent), Superintendent of the Montreal (Can.) gas works, sailed for England last Thursday, per steamer "Lake Simcoe," his objective point being the coronation services. Having heard of his intention and wishing to take advantage of the opportunity to show him some special mark of respect, the employees of the gas works assembled at his residence, 177 Harbor street some evenings ago and presented him with a traveling bag and a pair of marine glasses. They also presented Mrs.

Skinner with a portmantu and a deck shawl. After the presentation formalities had been completed, Mr. and Mrs. Skinner entertained their visitors in right hospitable fashion.

THE residents of Parsons, Kas., are to vote upon the proposition to take over the plant of the local gas company for operation on municipal account.

MR. STEPHEN PEABODY has been elected President of the United Coke and Gas Company, vice the late Mr. W. L. Elkins, Jr.

LOCAL capitalists are preparing to establish a gas plant in Warren, Ills.

AT a special meeting of the shareholders in the Aurora (Ills.) Gas Light Company it was determined to change the name of the corporation to that of the Fox River Light, Heat and Power Company. It was also determined to amend its object and purpose to the end, that it may "manufacture, produce and distribute light, heat and power by any system or process that may now be in use, or which hereafter may come into use, in the city of Aurora and other cities and villages of the State of Illinois and elsewhere throughout the county of Kane and other counties in said State."

A CORRESPONDENT writing from Montreal, Can., under date of the 29th ult., says: "I regret to inform you of the death of the Hon. Frances Clemow, whose demise occurred yesterday. He was born May 13th, 1821, and was educated at Upper Canada College, Toronto. In 1840 he settled in Ottawa, where the rest of his life was spent. He was a Director in the Ottawa Gas Company and occupied a like position in the affairs of the Ottawa Electric Company. He was prominently identified with the business affairs of Ottawa in many channels. He took a live interest in municipal affairs and was a member of the City Council for 2 years. He was Chairman of the Ottawa Collegiate Institute Board for 25 years. He was Grand Master of the Orange Lodge of Carleton county for 8 years and was one of the stalwart supporters of the order in Eastern Ontario. In recognition of his eminent abilities he was called to the Senate in 1885, and rapidly forged to the front as a man of sound judgment and practical ideas. In 1892 his ability was recognized in his appointment as Chairman of the Committee of the Whole on the bill to codify the criminal laws of Canada. He was a staunch Conservative in politics and intensely imperialistic in sentiment."

THE syndicate controlled by Mr. W. T. Morris, of Ithaca, N. Y., has secured possession of the franchise and plant of the Canastota (N. Y.) Electric Light and Power Company.

ON and after July 1st the selling rates in Ithaca, N. Y., are to rule as follows: On illuminating account, $1.60 per 1,000 cubic feet, gross; $1.50 net; for a fuel use, $1.30 gross; $1.20 net.

MR. ROBERT D. MCCUE, Manager of the Petersburg (Va.) Gas Company, died at his home in that city the morning of the 28th ult. He was in his 36th year, and had managed the affairs of the Petersburg Company for some time over a year.

THE following circular notice was recently issued to the shareholders of the Providence (R. I.) Gas Company: "An increase of the capital stock of the Providence Gas Company having been authorized, the Treasurer will issue 5,000 shares of new stock, which is offered to stockholders of record at the close of business, Friday, June 20, 1902, in the ratio of 1 share of new stock for every 11 shares of old stock held by them as aforesaid, at the par value of $50 per share, payable in cash on or before Wednesday, July 2, 1902. No certificates for fractional shares will be issued, but for the purpose of facilitating settlements the Treasurer will purchase from parties entitled to 5-elevenths of a share, or less, their respective rights to fractional parts of shares at the rate of $4.50 for each 1-eleventh of a share, and will sell all so purchased to parties entitled to 6-elevenths of a share or more, at the same rate of $4.50 for each right to 1-eleventh of a share. All new stock not taken and paid for at the close of business Thursday, July 10, 1902, may be disposed of by the Directors at their discretion."

MR. FRANK B. WILLEY has been appointed Manager of the affairs of the United Gas and Electric Company in Jeffersonville, Ind.

AT the annual meeting of the Port Huron (Mich.) Gas Company the following officers were elected: Directors, P. H. Phillips, A. D. Bennett, L. A. Sherman, T. H. Eaton, E. T. Lynch, W. D. West and J. T. Lynn; President, J. T. Lynn; Vice-President, A. D. Bennett; Secretary and Treasurer, E. T. Lynch.

THE Springfield (Mass.) Gas Light Company will make important main extensions this season in the village of West Springfield.

THE certificate of incorporation of the Citizens Gas, Lighting and Heating Company, of Mount Vernon, Ills., has been filed. The concern is capitalized in $200,000.

THE transfer of the rights and properties of the Citizens Gas Light Company, of Jackson, Tenn., and of the Jackson and Suburban Railway, was made May 28th. The gas plant is to be rebuilt.

THE proprietors of the Painesville (O.) Gas Company have awarded a contract for a complete, new gas plant on coal gas lines to Mr. Fred. Bredel, of Milwaukee, Wis. Under the agreement the plant is to be ready for operating by October 1st.

THE Queens Borough Gas and Electric Company, to operate in Queens county, N. Y., has been incorporated. It is capitalized in $2,000,000, and the incorporators are John L. Lockwood, Jr., F. P. Delafield, Thos. Ferry and Chas. E. Wilson.

A MORTGAGE bond issue of $30,000 has been placed on the properties of the Hollidaysburg (Pa.) Gas Company.

THE following is from a recent issue of the Cincinnati *Enquirer:* "The long talked of litigation over the difference in price of gas charged by the Cincinnati Gas and Electric Company has materialized, and suit has been filed to enjoin the Company from charging 75 cents per 1,000 feet for illuminating gas when the price of fuel gas is but 50 cents. It has been the claim of many persons that as the same gas is used for fuel purposes as is used for illuminating the charging of a greater price when it is used for one purpose than when it is used for another is a discrimination in favor of those who use it for the purpose for which the lesser price is charged. That is the basis of the suit which will test the right of the Company to make a difference in the price. It will also be claimed, when the case is tried, that after the gas has passed the meter it does not belong to the Company, but to the person to whom it has been served, and that it is of no moment to the Company whether it is used for fuel or illuminating purposes. The lower price is demanded. This is a suit in which all are interested. It is claimed that many persons who use gas for fuel because they live in flats where they are compelled to use gas stoves are unable to procure the gas for the fuel price, owing to the fact that the Company will not put down a supply pipe further than from the street to the meter, the consumer being compelled, if he wants to get the benefit of the fuel price, to pay the expense of a pipe from the meter to his stove. In flats of 7 and 8 stories the expense of the pipe to those upper floors is great. In this way flat dwellers are forced to pay 75 cents for the gas that is used for fuel, though that is the price for illuminating purposes. Thus, it is declared, the Company gets the higher price for the gas used for the purpose for which a lower price was provided by the ordinance, that law also providing that the Company need not put in a fuel service pipe farther than has been mentioned. It is claimed the Company will not put a meter between the one which registers the gas as it comes from the street mains and the stove where it is burned for fuel purposes, and subtract the one registration from the other, and thus get at the amount used for fuel and the amount used for illuminating purposes. Efforts have been made to have the Company adopt the plan, but the officials have declined, because they say they cannot keep books for such a system. The plaintiff in the suit filed is C. Woolford, of Riverside, and the attorney ex-Judge D. T. Wright."

ACCORDING to *Electricity*, for the first time in 6 years the entire installation of the Niagara Falls Power Company was shut down June 1 and the mammoth turbines and dynamos stood still. The object was to make an inspection of the big tunnel and wheel pit and knock out the bulkhead in the tunnel extension between the two wheel pits, thus permanently connecting them. The time selected was after midnight when the demand for power was the least. Engineers made a thorough inspection of every part of the tunnel and it was found in a perfectly sound condition, not one of the 19,000,000 bricks in the lining being out of place. All industries on the power Company's lands were shut down and Buffalo was without power until 7 A.M.

The Market for Gas Securities.

The transactions in local gas shares for the week were few and far between, and the trading was all done on a gradually descending scale of values. Consolidated closed to-day (Friday) at 219½ to 220½, and some of the posted ones predict that considerably lower prices are close at hand. No real reason for such decline exists, but financial apathy is often accountable for queer results. The market for city gas bonds remains firm; and there is an occasional inquiry for Mutual.

Brooklyn Union is nominally 233 to 239, whereas practically it should certainly be well over 250. We understand that interests not altogether friendly to the Brooklyn Union Company have secured control of the properties of the Kings County Gas and Illuminating Company. It is not likely, however, that any belligerent spirit will be developed as a result of the change in ownership. Washington (D. C.) gas shows a tendency towards lower values. Indianapolis bonds are steadily appreciating in quoted value. The general gas share list is steady.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 Wall Street, New York City.

June 9.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	219½	220½
Central Union, Bonds, 5's.	3,000,000	1,000	109	110
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	350	..
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. ..				
Bonds, 5's	11,000,000	1,000	111½	..
Northern Union, Bonds, 5's.	1,250,000	1,000	106	108
New York and East River..				
Bonds 1st 5's	3,500,000	1,000	112	113
" 1st Con. 5's	1,500,000	..	109	111
Richmond Co., S. I.	348,650	50	100	..
" Bonds	100,000	1,000	103	..
Standard	5,000,000	100	130	140
Preferred	5,000,000	100	150	160
Bonds, 1st Mortgage, 5's	1,500,000	1,000	114	117
Yonkers	299,650	500	130	
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	233	239
" " Bonds (5's)	15 000,000	1,000	119	119½
Bay State	50,000,000	50	2⅛	2¼
" Income Bonds	2,000,000	1,000	.	75
Binghamton Gas Works	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	95	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	13	13¼
" " Bonds, 5's	5,250,000	1,000	83½	84½
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000		
Central San Francisco	2,000,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas & Elec. Co.	29,500,000	100	103½	103¾
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	108	109
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¼	89¼
Preferred	3,026,500	100	106¼	107¼
Consumers, Jersey City Bonds	600,000	1,000	102	103
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore	11,000,000	100	67¼	68½
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	14	17
" Con. Mtg. 5's	880,000	1,000	85	87
Consolidated G. & E. Co.'s., Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co.	4,825,500	50	.	89
" Prior Lien 5's	5,603,000	1,000	99½	100
Detroit Gas Co., 5's	382,000	1,000	70	73
" Inc. 5's	16,000	100	94	94½
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	34	38
Fort Wayne	2,000,000	..	.	.
" Bonds	2,000,000	..	58	63
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	75	80
" Bonds, 6's	2 650,000	..	102	104
Jackson Gas Co.	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	85	90
Preferred	2,500,000	100	..	110
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100		60
Bonds	1,000,000	1,000	53	64
Louisville	2,570,000	50	110	120
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	107½	109½
" 6 per cent. scrip, due 1910	100,000	25	25	87
Montreal, Canada	2,000,000	100	182	184¾
Newark, N. J., Con. Gas Co	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	165	165¾
New Haven	1,000,000	25	300	325
Nashville Gas Lt. Co.	1,000,000	100	110	..
Oakland, Cal.	2,000,000	..	46	47
" Bonds	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	100¾	101
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	48	48½
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	92	93
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	95	96½

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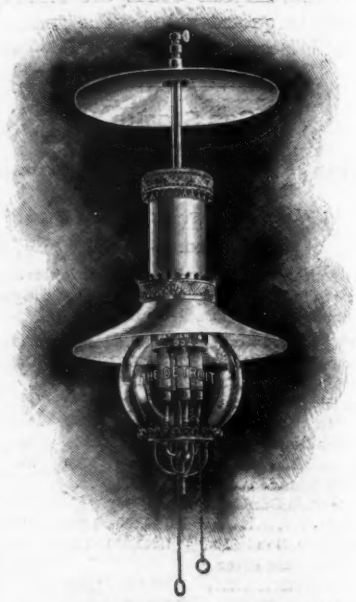

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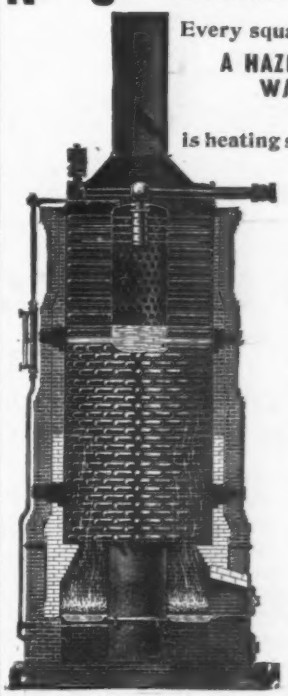

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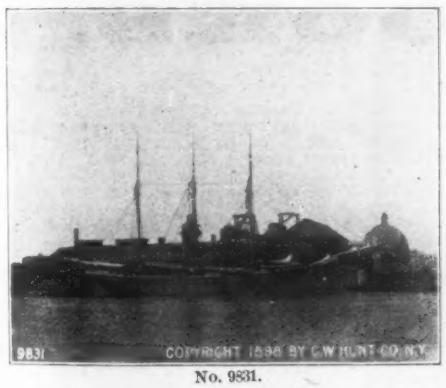

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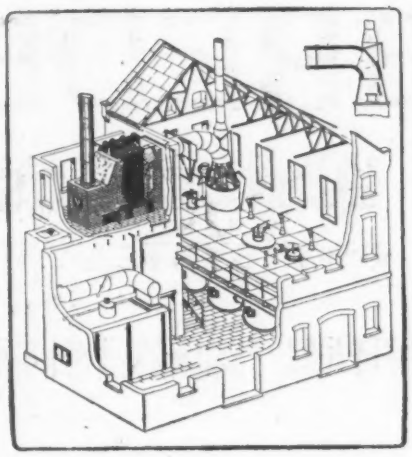

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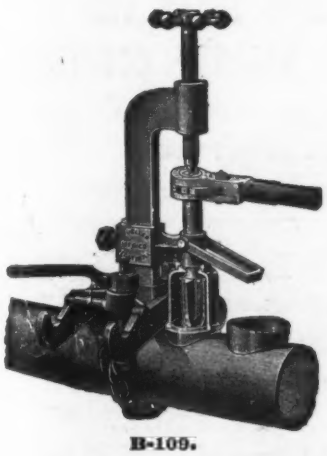

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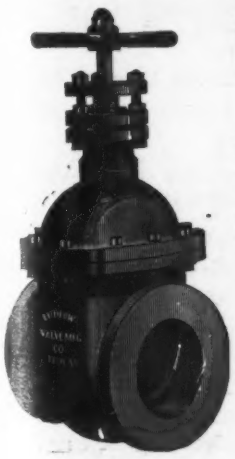

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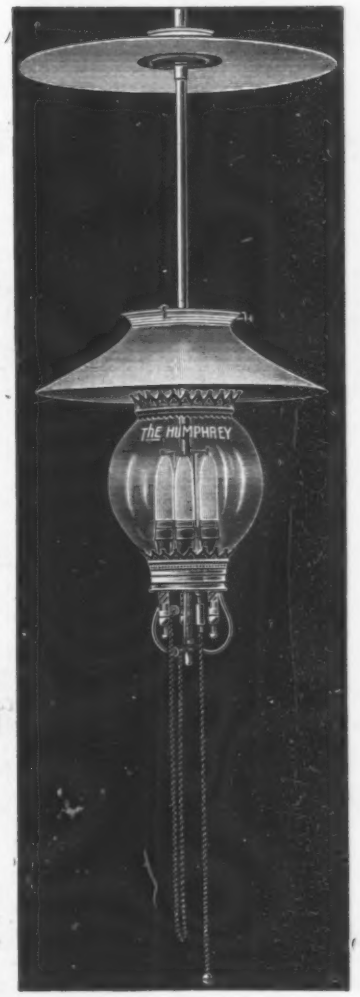

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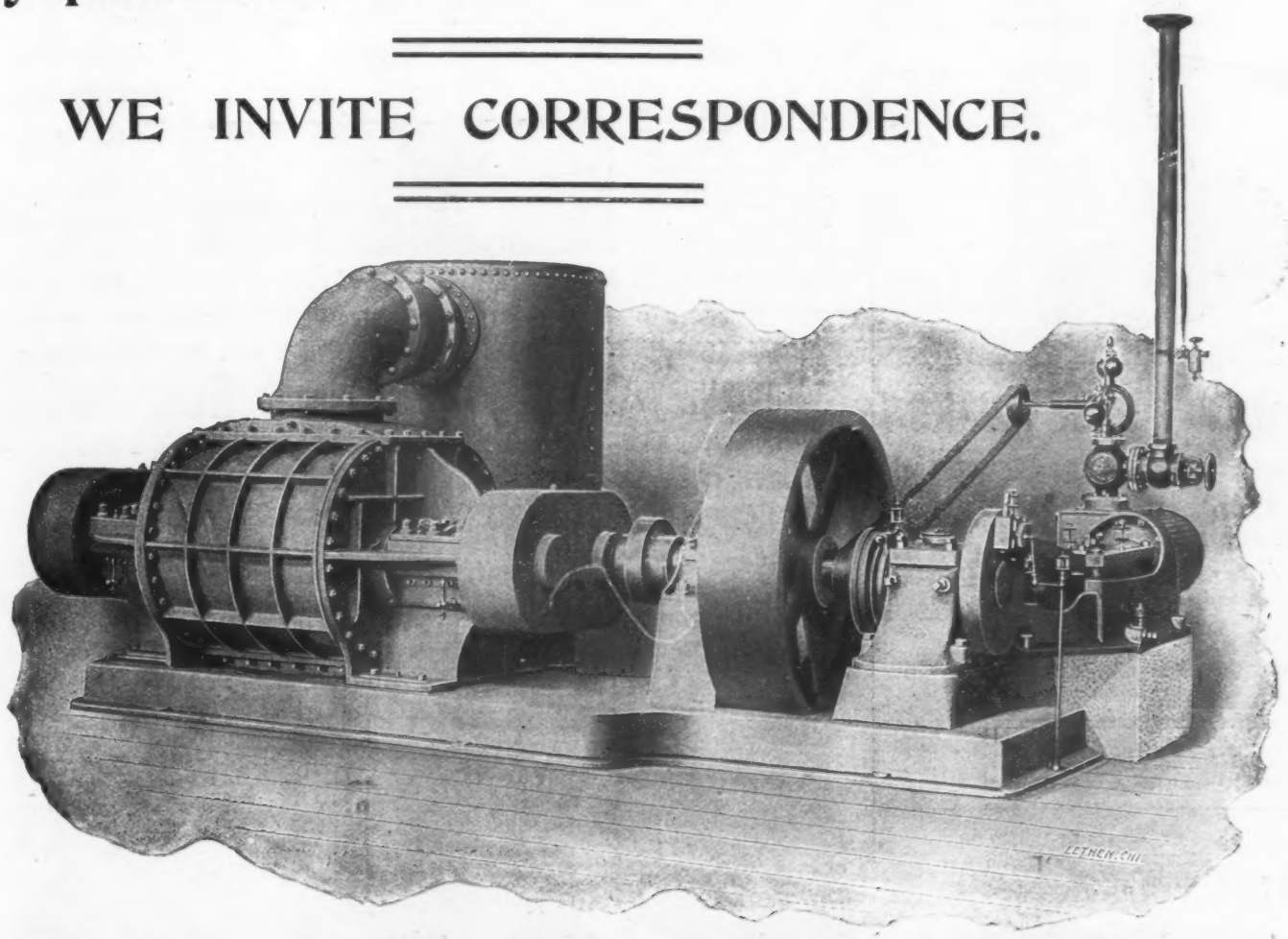

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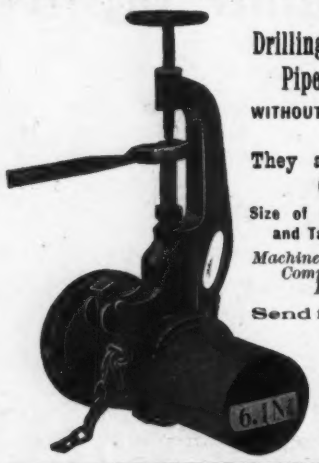

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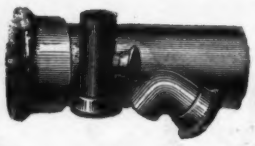

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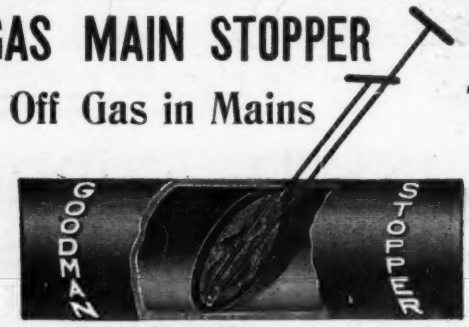

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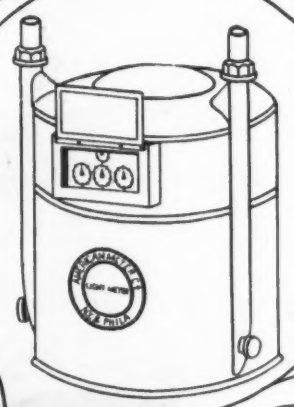

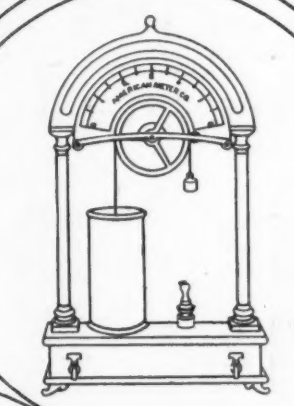

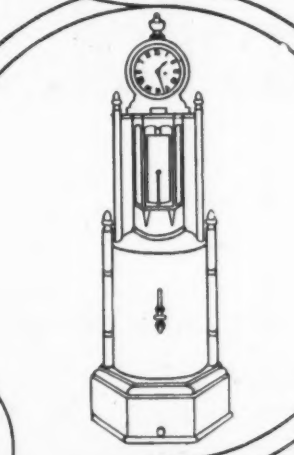

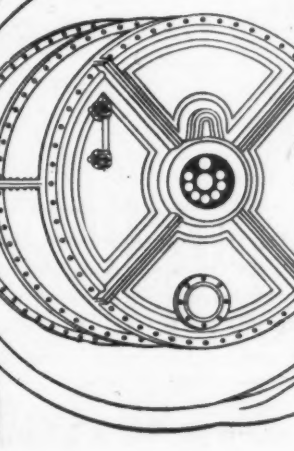

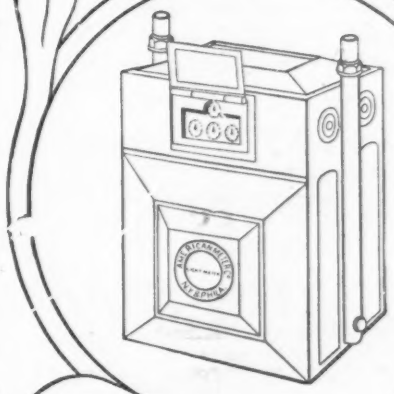

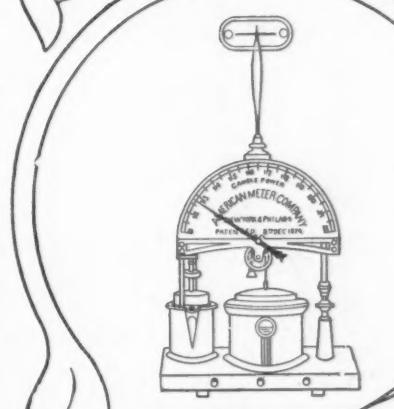

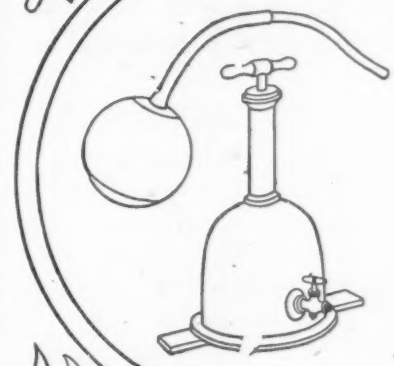

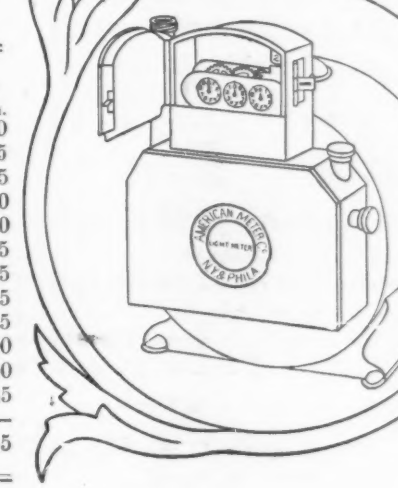

PUBLIC LIGHTING TABLE.

JUNE, 1902.

Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Light.	Extinguish.
				P.M.	A.M.
Sun.	1	7.50 PM	2.50 AM	7.15	3.15
Mon.	2	7.50	3.30	7.15	3.15
Tue.	3	7.50	3.30	7.15	3.15
Wed.	4	7.50	3.30	7.25	3.15
Thu.	5	7.50 NM	3.30	7.25	3.15
Fri.	6	7.50	3.30	7.25	3.15
Sat.	7	7.50	3.30	7.25	3.15
Sun.	8	8.00	3.30	7.25	3.15
Mon.	9	8.00	3.30	7.25	3.15
Tue.	10	10.00	3.30	7.25	3.15
Wed.	11	10.40	3.30	7.25	3.15
Thu.	12	11.10 FQ	3.30	7.25	3.15
Fri.	13	11.40	3.30	7.25	3.15
Sat.	14	12.10 AM	3.30	7.25	3.15
Sun.	15	12.40	3.30	7.25	3.15
Mon.	16	1.20	3.30	7.25	3.15
Tue.	17	1 50	3.30	7.25	3.15
Wed.	18	2.30	3.30	7.30	3.15
Thu.	19	No L.	No L.	7.30	3.15
Fri.	20	No L. FM	No L.	7.30	3.15
Sat.	21	No L.	No L.	7.30	3.15
Sun.	22	8.00 PM	9.30 PM	7.30	3.15
Mon.	23	8.00	10.10	7.30	3.15
Tue.	24	8.00	10.40	7.30	3.15
Wed.	25	8.00	11.10	7.30	3.15
Thu.	26	8.00	11.40	7.30	3.15
Fri.	27	8.00	12.20 AM	7.30	3.15
Sat.	28	8.00 LQ	12.50	7 30	3.15
Sun.	29	8.00	1.20	7.30	3.15
Mon.	30	8.00	2.00	7.30	3.15

TOTAL HOURS LIGHTING DURING 1902.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	238.30	January	423.20
February	196.20	February	355.25
March	196.20	March	355.35
April	166.40	April	298.50
May	151.40	May	264.50
June	131.10	June	234.25
July	142.40	July	243.45
August	162.00	August	280.25
September	179.00	September	321.15
October	216.30	October	374.30
November	224.10	November	401.40
December	250.00	December	433.45
Total, yr.	2255.00	Total, yr.	3987.45

NEW YORK, 33 Nassau Street. PHILADELPHIA, Broad and Arch Streets. CHICAGO, Foot of Orleans Street. BOSTON, 624 Tremont Building.
CLEVELAND, 809 Cuyahoga Building. ST. LOUIS, 712 Roe Building. SAN FRANCISCO, 712 Polk Street.

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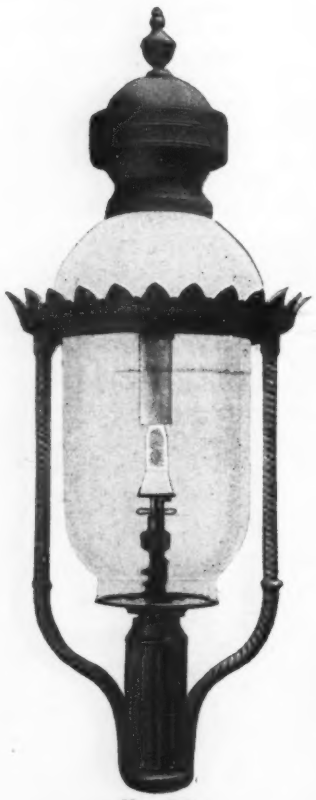
.... OF AMERICA ....



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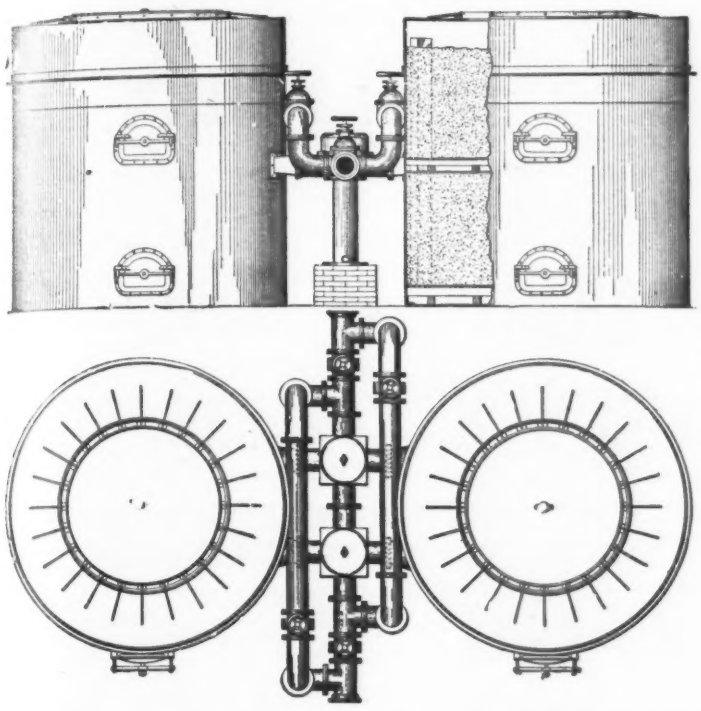

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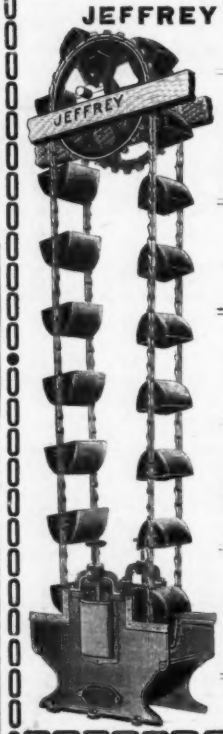

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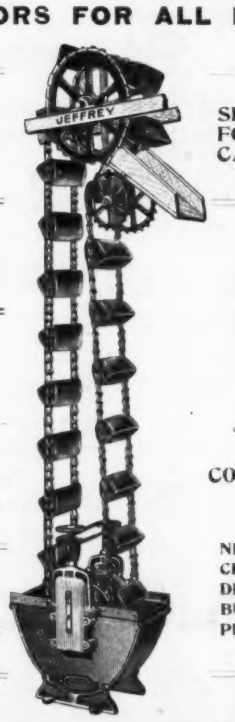

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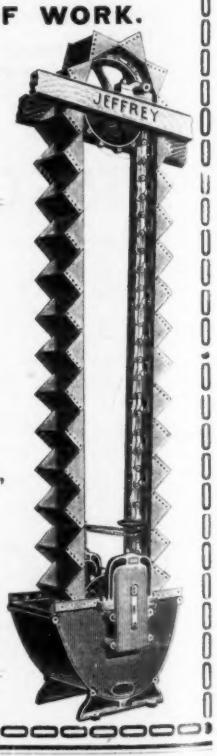

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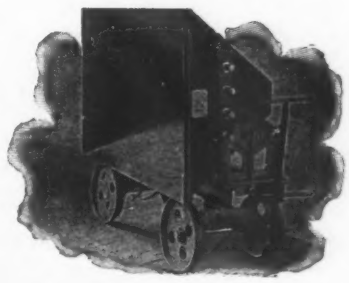

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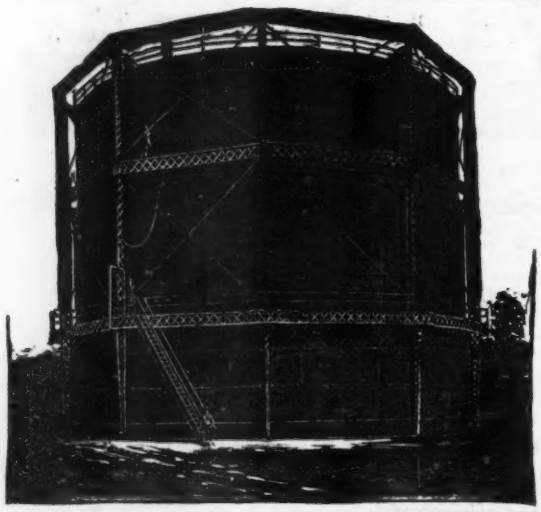

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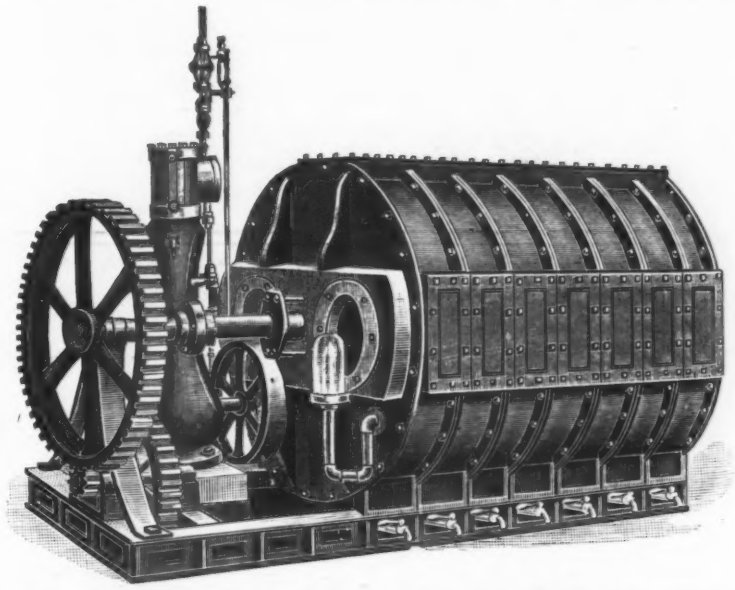

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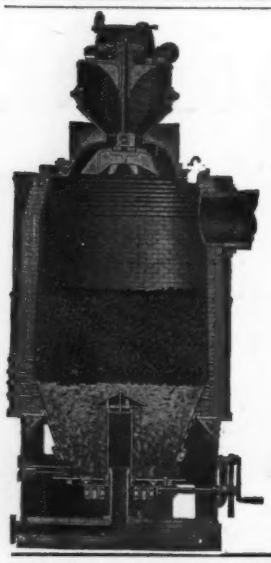

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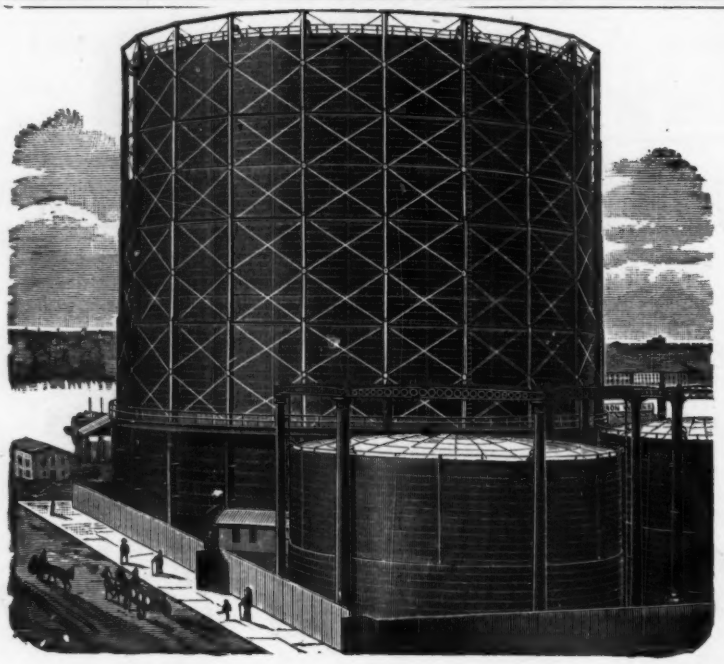

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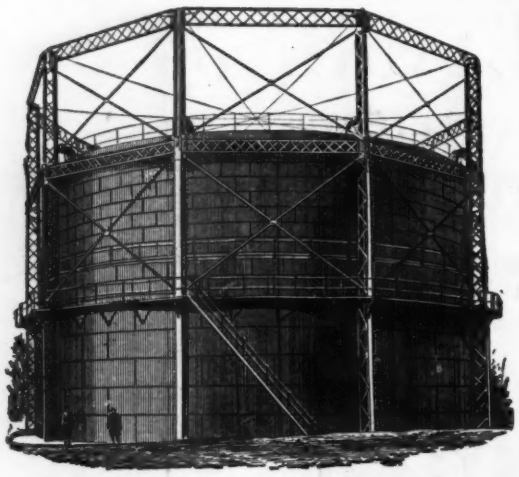

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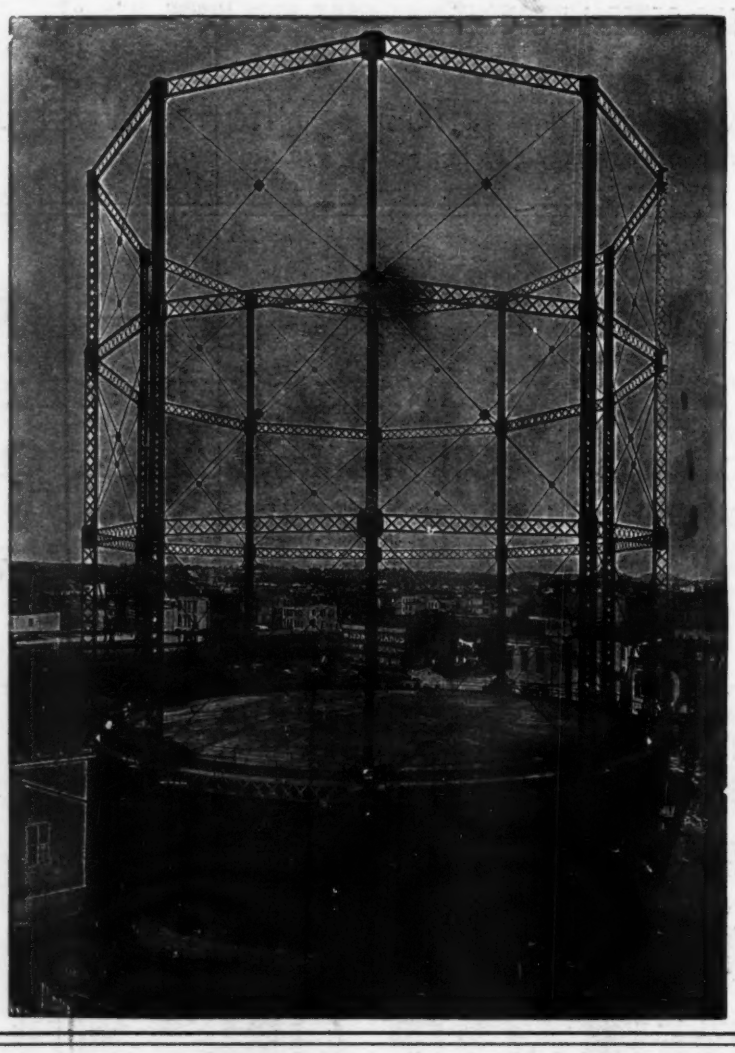

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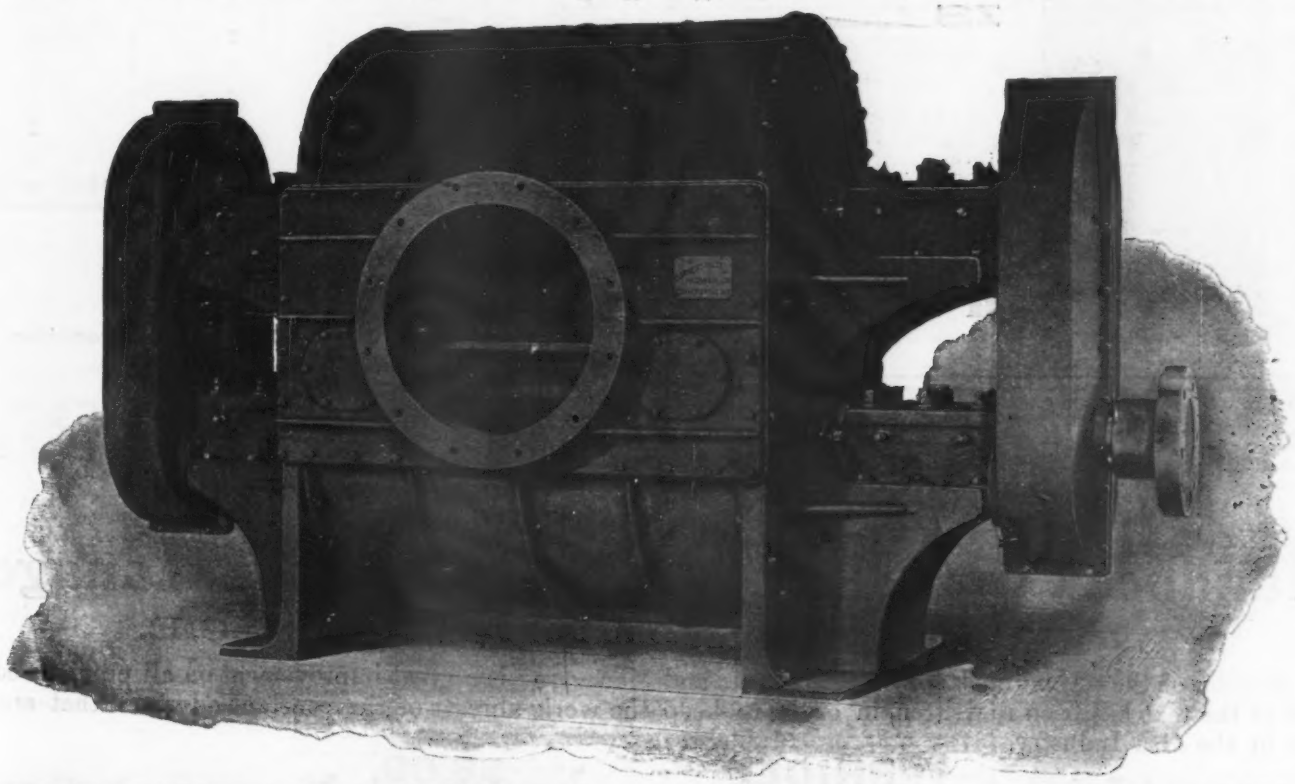

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